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Computer Sciences Corporation

September 1982

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NAVAL OCEAN SYSTEMS CENTER San Diego, California 92152



NAVAL OCEAN SYSTEMS CENTER, SAN DIEGO, CA 92152

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JM PATTON, CAPT, USN

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Commander

Technical Director

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NONLINEAR REGRESSION ANALYS S METHODOLOGY FOR THE ESTIMATION OF DETECTION PROBABILITIES FROM EMPIRICAL DATA

September 1982

Prepared by:

J. L. Hofmockel Computer Sciences Corporation 4045 Hancock Street San Diego, California 92110

Prepared for:

Naval Ocean Systems Center San Diego, California 92152

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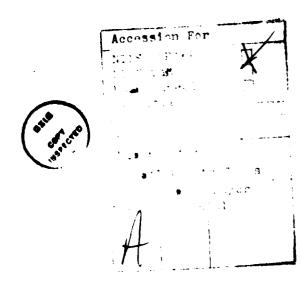
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INTRODUCTION

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The Naval Ocean Systems Center (NOSC) was tasked by NAVELEX 612 under the subject of empirical detection analysis to develop techniques for estimating detection probabilities. Computer Sciences Corporation (CSC) was subsequently tasked by NOSC to develop data bases and nonlinear regression analysis techniques to describe the acoustic detection process as a function of signal excess.

Statistical techniques, primitive empirical data bases and ancillary computer programs used to relate the empirical data to models were developed previously at NOSC during other analyses of acoustic detection probabilities. These resources and the UCLA Department of Biomathematics (BMDP) Statistical Software were made available as a baseline for the nonlinear regression analysis methodology used in this investigation.



PROBLEM STATEMENT

Technical Requirements

The general problem addressed in this task is to establish a methodology for the determination and use of parameters that describe acoustic detection as a function of signal excess. The statistical technique to be used is nonlinear regression analysis using the computer programs available in the UCLA BMDP statistical programs library available on the UNIVAC 1100/82 system at NOSC.

Specific subtasks assigned and addressed in this report are to:

- 1. Establish the viability of the current version of the BMDP nonlinear regression software.
- 2. Prepare data bases for input to the nonlinear regression analysis programs.
- 3. Write computer programs to implement the Gaussian distribution function in the nonlinear model.
- 4. Perform nonlinear regression analysis with supplied data sets.

Approach

The derivation of the regression model used in this study is based on the sonar equation and the concept of random acoustic fluctuations. The passive sonar equation may be stated in decibel form as:

$$SE = SL - TL - AN + AG - RD$$

where

SE is signal excess

SL is source level

TL is transmission loss

AN is ambient noise level

AG is array gain

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RD is recognition differential (detection threshold)

The term performance index (PI) is defined as follows:

$$PI = TL + (AN - AG)$$

Substituting PI into the sonar equation gives

$$SE = (SL - RD) - PI$$

It is known that there are random acoustic fluctuations which cause the signal excess to vary over time even though the sonar equation parameters are held constant and that these fluctuations have a standard deviation about the mean of approximately 8 dB. The sonar equation can be rewritten in a form normalized to the standard deviation of signal excess (σ) .

$$\frac{SE}{\sigma} = \frac{SL - RD}{\sigma} - \frac{PI}{\sigma}$$

Linear Regression Model

Considering that PI is the independent variable which varies as a target moves about within tracking range of an array and that the probability of detecting and holding a target depends on the signal excess, the above form of the sonar equation suggests a simple linear slope-intercept regression model.

$$Y = P_1 + P_2X + \epsilon$$

where

Y is the inverse cumulative Gaussian of (1-fractional holding time)

X is the performance index

 $P_1 = (SL - RD)/\sigma$ is the Y-intercept of the regression line

 P_2 = $1/\sigma$ is the slope of the regression line

ε is the error term

The linear regression model may be extended to include empirical data from several different targets by the use of dummy variables. Then the equation becomes:

$$Y = P_1 + P_2 X_1 + P_3 X_2 + P_4 X_3 + ... + P_{n-1} X_n + \epsilon$$

where

X₂ ... X_n are coded as 1 to indicate the presence of specific additional targets data and 0 otherwise.

This arrangement as a multiple linear regression model provides for separate parallel regression lines with different intercepts for each target contributing data to the sample but a common slope for all regression lines. The advantage of multiple regression analysis is a better estimate of the slope due to increased sample size which for practical cases greatly overrides the disadvantage of giving up an additional degree of freedom for each dummy variable added.

Nonlinear Regression Model

Previous regression analyses performed at NOSC used the linear regression model described in the previous paragraphs. However, the current task is to perform the regression analyses using nonlinear regression, that is, a model of the form:

$$Y = 1 - F(Z) + \varepsilon$$

where

$$F(Z) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{Z} e^{-(t^2)/2} dt; \text{ the cumulative Gaussian distribution}$$
 function

$$Z = P_1 + P_2 X_1 + P_3 X_2 + \dots + P_n X_{n-1}$$

Y is the probability of detecting/holding a contact (assumed to be a nonlinear function of P_i , X_i)

ε is the error term

This model will permit the use of a different weighting function than that used with the linear model which effectively excluded some data points by zero weighting. Hopefully, a more accurate determination of regression parameters will result. The BMDP Statistical Software (references 1 and 2) available at NOSC contains computer programs suitable for implementing this nonlinear regression model.

Weighting Function

There is no basis to assume that the variance of the error term in the regression equation is homogeneous, therefore it is necessary to use case weighting (reference 1, p 302) inversely proportional to the variance. The weighting function provided for this study is:

$$W_i = \frac{T_i^2}{[1 - F(Z_i)] F(Z_i)}$$

where

 W_i is the weighting assigned to a datum

 $T_{\mathbf{i}}$ is the available holding time for the datum

 $F(Z_{\frac{1}{2}})$ is the cumulative Gaussian distribution function evaluated for the datum

The weighting function is used in the nonlinar regression algorithm as part of the least squares criterion for a best fit to the observed data. That is, when determining the parameters for regression line equations, the term

$$\sum_{i=1}^{N} W_i (Y_i - Y_i)^2$$

is minimized where:

i is the case index

 W_i is the weight for a particular case

 Y_i is the observed fractional holding time

 Y_i is the predicted fractional holding time

RESULTS AND DISCUSSION

Nonlinear Regression Computer Program Viability

BMDP Software, 1977 Version

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At the commencement of this study, the 1977 version of the UCLA BMDP Statistical Software library (reference 2) was operational on the UNIVAC 1100/82 at NOSC and the 1981 version of the programs (reference 1) was undergoing installation. Initial program evaluation was accomplished using the 1977 versions of both the P3R and the PAR nonlinear regression analysis programs (reference 2, p 464). First the example problems presented with the program description in the BMDP documentation were executed and the outputs verified with the published outputs. The examples were found to execute as advertised in the BMDP document. Next an example was taken from a textbook (reference 3, example 10.4) which had been worked out using a nonlinear regression algorithm different than the one implemented in the BMDP programs. The nonlinear function implementing this example was programmed and collected with both the P3R and PAR programs. The regression equation parameters obtained by executing P3R and PAR matched those in the textbook example. Finally, three sets of data were taken from prior linear regression analyses and processed through the P3R and PAR software programmed for the cumulative Gaussian nonlinear regression model with iteratively reweighted least squares described in previous paragraphs. Results from executing the programs yielded parameters which compared favorably with the linear regression. Appendix A lists the formatted outputs from the 1977 version of the nonlinear regression analysis programs.

Comparison of P3R and PAR Programs

The BMDP P3R and PAR programs both perform nonlinear regression by the minimizing of least squares criterion. The algorithms differ operationally in that P3R requires the first partial derivatives of the nonlinear function with respect to each parameter in the regression equation while PAR does not require them. Parameter estimates output from the two programs were generally in good agreement for the cases tested but PAR required more iterations to converge to a solution than P3R. Since the partial derivatives and satisfactory initial estimates can be specified for the cumulative Gaussian function, the P3R program was selected as the best algorithm to use for this study.

BMDP Software, 1981 Version

When the 1981 version of the BMDP P3R program was installed on the UNIVAC 1100/82 the same checkout procedures as executed for the 1977 version were used. The results from the two versions were found to be essentially in agreement. The 1981 version of the program contains some more advanced features than the 1977 version and appears to converge with fewer iterations so the 1981 version of the P3R program is the best program to use for the nonlinear regression analyses assigned to this task. Appendix B lists the outputs from the execution of the 1981 version of the P3R nonlinear regression analysis program.

Evaluation of Cumulative Gaussian Distribution Function

Initial efforts with the 1977 BMDP programs used the single precision subroutine MDNOR available in the IMSL mathematical subroutine library on the UNIVAC 1100/82 at NOSC (reference 4). The BMDP P3R and PAR programs both operate in double precision but the IMSL double precision subroutine MDNORD is not implemented in the IMSL-8 library at NOSC. It became apparent during runs with the nonlinear regression model that a double precision subroutine for evaluation of the cumulative Gaussian distribution function would be required because the dynamic range of the input argument during the regression program iterations sometimes exceeded the capability of the single precision subroutine to calculate the function.

MDNORD Subroutine Algorithm

A double precision subroutine, called MDNORD after the nonimplemented IMSL subroutine, was developed for use with the nonlinear regression analysis model. This subroutine is based on the recursive evaluation of continuing fraction expressions which estimate the area under the normal or Gaussian distribution function (reference 5, arts. 26.2.14 and 26.2.15). The algorithm developed for subroutine MDNORD uses the art. 26.2.14 equation for arguments where the magnitude of x is greater than three, i.e.,

$$Q(x) = Z(x) \left\{ \frac{1}{x+} \frac{1}{x+} \frac{2}{x+} \frac{3}{x+} \frac{4}{x+} \dots \right\}; |x| > 3$$

and when the argument is equal to or less than three the art. 26.2.15 equation is used.

$$Q(x) = \frac{1}{2} - Z(x) \left\{ \frac{x}{1-} \frac{x^2}{3+} \frac{2x^2}{5-} \frac{3x^2}{7+} \dots \right\}; |x| \le 3$$

where

- x is the abscissa of the Gaussian distribution function expressed as the number of standard deviations from the mean.
- Q(x) is the complement of the area under the Gaussian (1-area).
- Z(x) is the ordinate of the Gaussian distribution function.

This dual algorithm was used because testing showed that the number of terms required for the art. 26.2.14 equation to reach double precision accuracy increased as the input argument x became smaller whereas the art. 26.2.15 equation exhibited the reverse effect with the number of terms required increasing as x became larger. A convenient branching point was reached at a value of x = 3 standard deviations from the mean.

The FORTRAN program listing and test outputs for subroutine MDNORD are included in Appendix C of this report. The source and relocatable code are located in PASS*NRL.MDNORD on the UNIVAC 1100/82.

Continuing Fraction Evaluation

A convenient theorem on the evaluation of continued fractions (reference 5, art. 3.10) was implemented in subroutine MDNORD. This theorem provides a matrix multiplication technique for evaluation of the n^{th} fractional of the continued fraction.

$$f_n = \frac{A_n}{B_n} = \left\{ b_0 + \frac{a_1}{b_1^+} \frac{a_2}{b_2^+} \frac{a_3}{b_3^+} \dots \frac{a_n}{b_n^+} \right\}$$

 ${\bf A}_n$ and ${\bf B}_n$ are by definition terms expressing the numerator and denominator of the ${\bf n}^{th}$ fractional which are used in stating the matrix form of the theorem.

$$\begin{bmatrix} A_n \\ B_n \end{bmatrix} = \begin{bmatrix} A_{n-1} & A_{n-2} \\ B_{n-1} & B_{n-2} \end{bmatrix} \begin{bmatrix} b_n \\ a_n \end{bmatrix}$$

Calculation of the nth fractional can be done recursively once the two matrices on the right side of the equation are initialized. The MDNORD program uses a recursive calculation loop for $f_n = (A_n)/B_n$ which continues until the difference between consecutive terms is less than 1×10^{-19} .

P3RFUN and FUN Subroutines

The Cumulative Gaussian Nonlinear Regression function described previously is implemented as subroutine P3RFUN. This subroutine is written in FORTRAN and is listed in Appendix C. The logic is set up to evaluate the expression

$$Y(Z) = 1 - \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{Z} e^{-t^2/2} dt + \epsilon$$

where

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$$Z = P_1 + P_2 X_1 + P_3 X_2 + ... + P_n X_{n-1}$$

and the first partial derivatives of Y with respect to the nonlinear parameters P_1 , P_2 , ..., P_n (see reference 6, art. 67, differentiation under the integral)

$$\frac{dY(Z)}{dP_1} = \frac{1}{\sqrt{2\pi}} e^{-Z^2/2}$$

$$\frac{dY(Z)}{dP_{2...n-1}} = (X_{2...n}) \left[\frac{dY(Z)}{dP_1} \right]$$

as well as the weighting function

$$W_{i} = \frac{T_{i}^{2}}{[1 - F(Z_{i})] F(Z_{i})}$$

each time the BMDP P3R nonlinear regression program calls P3RFUN.

Each iteration of the nonlinear regression analysis algorithm causes a call to P3RFUN for each case in the input data set. Thus the total number of calls to P3RFUN during a nonlinear regression analysis run is the number of iterations times the number of cases. Program branches are provided to write a debug aid file on logical unit 20 if the BMDP P3R input NUMBER is set to a value of 3. The data written in the debug file is the sequential number of the call to P3RFUN, the case number, the

value of $Z = P_1 + P_2 X_1 + P_3 X_2 + \ldots + P_n X_{n-1}$, the area under the Gaussian distribution curve and the value of the weighting function. This feature can create a large amount of data and should be used only under controlled conditions to observe the variations in the arguments when a close look is needed at the dynamics of the nonlinear regression algorithm. Normally, the input NUMBER is set to a value of 2 for iteratively recalculated weighting. If desired, any constant weighting input is used via a branch which activates when NUMBER is set to 1.

Very large values of the weighting function sometimes occur for extreme values of the input argument Z to the P3RFUN program. These can be seen to cause the factor Y(Z)[1-Y(Z)] to approach zero for either Y(Z) approaching 1 or Y(Z) approaching 0 which corresponds to a Z value near one or the other tails of the Gaussian distribution function. Whenever the factor [Y(Z)][1-Y(Z)] becomes zero by exceeding precision limitations the factor is reset to 1.0×10^{-38} in order to avoid division by zero. In this event, the sequential call number, case number, Z value, area under the Gaussian and the factor are all written to a file on logical unit 21. In addition, the condition word is set so that the executive can sense the condition and the file can be printed out.

Subroutine FUN is the equivalent of subroutine P3RFUN without the evaluation of the derivatives. This subroutine is used with the PAR program in the same way that P3RFUN is used with the P3R program. The FORTRAN source code for both P3RFUN and FUN are included in Appendix C of this report.

Collection of Executable Programs

The MAP directives used to collect the cumulative Gaussian nonlinear regression model programs are listed in Appendix C. The executable programs are located in files PASS*NLR.P3R81, PASS*NLR.P3R77 and PASS*NLR.PAR77. The BMDP programs provided in the NOSC implementation on the UNIVAC 1100/82 have computer programs available to assist the user

in constructing the MAP as well as the externally provided nonlinear function. These programs are invoked by using the appropriate EXEC 8 command from the following list:

@N*BMDP77.3RBUILDF
@N*BMDP77.ARBUILDF
@N*BMDP81.BUILDFUN/P3R
@N*BMDP81.BUILDFUN/PAR

The user then inputs the external function FORTRAN code excluding the DIMENSION or VARIABLE typing and the RETURN, END.

Output from the above processors is written to logical unit 8 so the program may be collected (@MAPed) and executed in file TPF\$. by simply using the @ADD 8 command. However, if repeated executions of the absolute element are desired, as in this project, it is wasteful of time and computer resources to collect the program each run. Therefore the MAP commands were extracted from the logical unit 8 file by means of the MED text editor and saved for use as a separate set of directives. The user may also save the FORTRAN code for the external function in a similar way if desired.

Input Data Base Construction

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Empirical detection data was taken from two sources and reformatted for input to the BMDP nonlinar regression analysis programs. The input data base for the PAR and P3R programs is constructed as symbolic elements in the FILE.ELEMENT format of the UNIVAC 1100/82 EXEC 8. Two programs were written to reformat data files from either the linear program input format or the primitive data format.

FILEPROC Program

The FILEPROC program is designed to accept data in the format used for the linear regression analysis program and to reformat it for input to the nonlinear regression analysis programs. Operation of the program is interactive in demand mode at a terminal. The EXEC 8 command @XQT PASS*NLR.FILEPROC runs the program. The user should have input data available in either files or elements of files so that it can be added to the runstream at the terminal by the @ADD command when solicited. The output is written to a formatted data file on logical unit 8 and the data can be moved about from the unit 8 file by the MED processors. The FORTRAN code and an example execution of the FILEPROC program are included in Appendix D.

FILPROCS Program

The FILPROCS program is similar to the FILEPROC program in that it reformats data for input to the nonlinear regression analysis programs. However, it receives data from a number of different input files (one for each sound projector or source recorded at an array) and combines the data into a single file. Therefore, the user must have at hand the set of files, previously extracted from primitive data, which represents the whole data set to be used for a nonlinear regression analysis run. The program is executed by the command @XQT PASS*NLR.FILPROCS and the file inputs are solicited interactively. It should be noted that the runstream entry @EOF is necessary after each data file is added as well as after all data is completed. The @EOF may be inserted in the input data file as shown in the FILPROCS example of Appendix D. These @EOFs are not a part of the files after they are extracted from the primitive data, i.e., they were inserted by means of the MED processor for convenience. Output from the FILPROCS program is written to a data file on logical unit 8.

Post Processing Program - SXPROC

The BMDP P3R program data save files do not provide all quantities needed for the analyses of this project. Therefore a post processing program was developed to read selected data from saved printout files and process these data for display, particularly display on the basis of the signal excess. At this writing, SXPROC performs two functions, namely, collection of holding time data on the basis of signal excess and calculation of the parameter covariance matrix.

Signal Excess Versus FHT

The interpretation of the regression equation parameters as related to the sonar equation is as follows:

 σ = 1/P₂ is the standard deviation of the signal excess about the mean.

SL - RD = σ P₁ is the source level - recognition differential difference.

SX = (SL - RD) - PI is the signal excess.

where

PI is the performance index which is the independent variable in the regression analysis.

The holding time and available holding time are transformed from the 1.5 dB PI domain intervals and accumulated in the corresponding SX domain 1.5 dB intervals. After the data is accumulated for each source in this manner, it is summed over all sources to form the holding time data for the sensor. Then the nonholding time can be formed and combined with a count of the gains (number of source holding periods following a previous source loss) for each SX interval and used in likelihood ratio analyses of the data.

Parameter Covariance Matrix

The covariance matrix of the regression equation parameters is useful for analyzing the confidence intervals for the prediction equations. It is calculated from the BMDP P3R estimates of the standard deviations of the parameters and the correlation matrix for all the parameters using the relationship:

$$cov(P_i, P_j) = S_i S_j r_{ij}$$

where

 $\mathbf{S}_{\hat{\mathbf{1}}}$ is the standard deviation estimated for a parameter $\mathbf{P}_{\hat{\mathbf{1}}}$ and

 r_{ij} is the correlation coefficient between two parameters P_i and P_j .

The covariance matrix is stored and processed in lower left triangular format and a formatted printout of the matrix is available.

SXPROC Operation

The SXPROC program is designed for the FORTRAN NAMELIST type of input. The inputs available currently are:

- COVAR A logical variable set to T or F to initiate the covariance matrix calculation and display.
- SIGEX A logical variable set to T or F to initiate the FHT versus signal excess processing and display.
- FILNAM A character variable for inputting the data file name (up to 12 characters).
- ELEM A character variable for inputting an element name (up to 12 characters).

- VERS A character variable for inputting a version name (up to 12 characters).
- UNIT The logical unit to use for readin of the data file (default is LU 8).
- STOP A logical variable set to T for program stop, otherwise another set of namelist data is expected.

The execution of SXPROC is by the EXEC 8 command @XQT PASS*NLR.SXPROC.

The method of constructing a file for input is to breakpoint the print files for a P3R nonlinear regression run as illustrated in the example runstream for P3R81 in Appendix B. The MED processor is then used to save the printout file as an element/version of the intermediate file needed for input to SXPROC. Typically, element names might be selected to identify arrays and versions to identify variations of conditions at that array such as season. An example runstream for SXPROC using elements built from the P3R81 example is shown in Appendix E along with the formatted printouts resulting from the run. The FORTRAN source code for the SXPROC programs is also included in Appendix E.

Post Processing Program - NLRPLT

The NLRPLT program is designed to plot the nonlinear regression analysis prediction curves. It uses the saved printout files as input just as the SXPROC program does. Two different kinds of plots are plotted for each regression analysis run. The first kind of plot displays the prediction for each source contributing data to the analysis at a particular array with all curves on a single plot. The observed data, from which the predictions result, are shown in the same graph marked with X's of varying size. The size of the X's marking data are proportional to the square root of the case weights. Therefore it can be seen which points have greater or lesser amounts of influence on the regression curve. The second kind of plot displays the prediction

curve for one particular source along with the curves bounding the 95 percent confidence region for the predicted curve. A separate plot is made for each source in the data set.

The NLRPLT program is also capable of printing out the source levelrecognition differential differences for each source and the covariance matrix for the parameters of the regression equation.

NLRPLT Operation

The NLRPLT program is designed for the FORTRAN NAMELIST type of input similar to the SXPROC program. The inputs available are:

- FILNAM A character variable for inputting the data file name (up to 12 characters).
- ELEM A character variable for inputting the element name in the data file (up to 12 characters).
- VERS A character variable for inputting a version name (up to 12 characters).
- UNIT The logical unit to use for readin of the data file (default is LU 8).
- COVAR A logical variable set to T or F to indicate display of the covariance matrix.
- LEVELS A logical variable set to T or F to indicate display of source level-recognition differential display.
- PLOTS A logical variable set to T or F to indicate plot displays.
- STOP A logical variable set to T or F for program stop, otherwise another set of namelist data is expected.
- The execution of the NLRPLT program is by the EXEC 8 command

@XQT PASS*NLRPLT.NLRPLT.

Input file construction for NLRPLT is identical to that described for the SXPROC program (refer to previous paragraphs on SXPROC). An example runstream with the resulting plot and print outputs are included as Appendix F of this report. The FORTRAN source code and the MAP collection directives are also included.

Maximum Likelihood Criterion

Program P3R may be used with a maximum likelihood calculation to fit the nonlinear regression function to the data rather than the least squares criterion mentioned under the weighting function description. The method recommended (see reference 1, p 315) for recursive recalculation of the weighting function when fitting a curve such as the Gaussian to a data set is as follows:

Turn off the convergence criterion by using the following inputs to P3R.

CONVERGENCE IS -1.0. HALVING IS 0.

Rescale the standard deviations of the parameters to convert them to standard errors by the input.

MEANSQUARE IS 1.0.

This method used with a maximum of 15 iterations gives the best results for nonlinear regression parameters. A sample runstream and P3R program outputs are included in Appendix B as run P3R81A.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Based on the results of computer runs during this task it is concluded that:

- The P3R program is the better nonlinear regression analysis program for fitting the cumulative Gaussian function to observed data for this task.
- The 1981 version of the P3R program gives results essentially the same as the 1977 version.
- Data observations indicating the absence of detection as well as data indicating detections are effectively included in the nonlinear regression.

Recommendations

It is recommended that:

• Future nonlinear regression analysis runs use the 1981 version of the UCLA BMDP P3R program and the maximum likelihood criterion.

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APPENDIX A

BMDP 1977 VERSION
NONLINEAR REGRESSION OUTPUTS

€PRT NLG.RUN/3R77BHILDA	IN/38778H1	LDA		•
PASS*NLR(1)	. RUN/357	78H1LDA(0)		
- ເ	#ULD*F 1F	COLD FIR. FIN, SI PURFUN	NIE DE DE NE NACE BUSAB NDAR IP XICCO	
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ស	10	DIMENSION DF (NPAR) . P (NPAR) ,	R). P(NPAR), X(NVAR)	
91	5	H)+X(3))	
~ œ	ם פ	$DF(2) = P(1) \cdot A(3) \cdot DF(3) = DEXP(P(4)) \cdot$		
ത	0	= P(3) *X(3)	!	
2:	<u> </u>	F = P(1)+OF(1) + P	P(3)+0F(3)	
- 21	END	OF COLUMN		i
13	٦.			
41				
ក្ ក	IN N. BNOP77	N.BMDP77.3RREL		
	IN MEMORY	. M		
8+	END			
61	EXQ1			
50	/PROBLEM			:
	THONA	IIILE IS RADI	SULFAIE	
23		S ARE	θ.	
24		FORMAT IS '(FB	`.	
	VVARIABLE		,	
- 1 50	:	NAMES ARE	COUNT, CASEWT, TIME.	
	/REGRESS			
B 6		INDEPENDENT IS CO		
300				
31		PARAMETERS ARE	4 =	
33	/PARAMETE	R		
34	•	INITIAL ARE	10,1, 5,01.	
35	ON C			
36	15.117	007749		
38		.010487		
39	•	.012093		
4 4	9.4820	.013900		
. 4		.018591	20	
.43		.020067		
77	•	.022249	30	
3 4 ሚ (•	.024177	40	
46	6.1554 6.2540	. 026393	S C C C C C C C C C C C C C C C C C C C	
48		.030039 7	70	
49	•	.031392	08	
50	•	.034102	06	
	5.0938	1 075360.		
53		.047267	05	
54	4,4468	.049453	09	
52	Ξ.	.052600	70	
	4.2669	3 .054928 180	.	
1	7	4	The state of the same of the s	. !

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: - END FTN 69 IBANK 25 DBANK 15002 COMMON

MAP.1 MAP 30RI S74TII 09/14/82 14:22:09 START=032126, PROG SIZE(I/D)=19091/31189 SYS\$*RLIB\$, LEVEL 74RIA END MAP. ERRORS: 0 TIME: 19.913 "STORAGE: 19840/6/040777/07777 **EXQT**

A-4

BMDP3R - MONLINEAR REGRESSION
HEALTH SCIENCES COMPUTING FACILITY
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PROGRAM REVISED FEBRUARY 1979 MANUAL DATE -- 1977

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IN THIS VERSION OF BINDPAR

THE FORM OF SPECIFYING LINEAR CONSTRAINTS HAS BEEN CHANGED. SEE BMDP-77 MANUAL PAGE 480. COMPUTATIONS ARE NOW PERFORMED IN DOUBLE PRECISION.

IF YOU USE SUBROUTINE FUN BE SURE ALL FUNCTION REFERENCES ARE IN DOUBLE PRECISION.

DEFAULT TOLERANCE FOR PIVOTING IS NOW .000000001. | |

PROGRAM CONTROL INFORMATION	NFORMATION
/PROBLEM	TITLE IS 'RADIOACTIVE SULFATE DATAF.
	VARIABLES ARE 3. FORMAT IS '(FB.4, FB.6, FB.0)'.
/VAKIABLE	NAMES ARE COUNT, CASEWT, TIME.
	DEPENDENT IS COUNT. INDEPENDENT IS TIME.
	NUMBER IS 1. PARAMETERS ARE 4. WEIGHT IS CASEWT.
/PAHAME LEN	INITIAL ARE 10
PROBLEM TITLE	PROBLEM TITLE RADIDACTIVE SULFATE DATA
NUMBER OF VARIABL NUMBER OF VARIABL TOTAL NUMBER OF VARIABLE OF VA	NUMBER OF VARIABLES TO READ IN
CASES	CASE LABELING VARIABLES LIMITS AND MISSING VALUE CHECKED BEFORE TRANSFORMATIONS BLANKS ARE

VARIABLES TO BE USED

(FB.4,FB.6,FB.0)

INPUT FORMAT

CASEWT

TIME

REGRESSION TITLE

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PARAMETER MAXIMA. Parameter Minima.			•					
INCR	INCREMENT	RESIDUAL OF SQUAR	DUAL SUM SQUARES	P(1)	P(2)	P(.3)	P(4)	
	0	10	592539	•	_ =	5.000000	010000	
-	- 6		379744	•	101484	4.947083	.000353	
	> c	9.0	058245	8.301627	- 130408	6.940312	-:003081	
	• •	9	.013453	10.542872	211035	7.330/24	003128	
:	0	0.	.012897		223769	7.364383	10000	
		. •	012850	11.290756	227774		003150	
	. 0	· •	012846	11.336529		٠.	003170	
		0.	012045	11.349533	606622	•	#/1500:	
	. 0	. •	012845	11.353258	229409		- 003175 - 003175	
	0	°.	012845	11.354327	229438		003176	
	•	0	012845	11.354633	229446	7.379195		
	•	•	012845	11.354722	229448	7.379202	003176	
	0			11.354747	229449	7.379204	003176	

Service Control of the Control of th

PARAMETERS
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ASYMPTOTIC

					-
p(4)	1.0000			TOLERANCE	. 1865292843 . 1970590595 . 2445051093
P(3)	1.0000	.0007556063		TOTIC	. 865841 . 018740 . 106597 . 000136
P(2)	1.0000	0.	11	STANDARD DEVIATION	
)d : (1)d	1.0000 8140 1459	SQUARE	EDOM	ESTIMATE	11.354747 229449 7.379204 003176
	-864	RESIDUAL MEAN SQUARE	DEGREES OF FREEDOM	PARAMETER	-864

1 14.508458 .362816 15.111700 .503242 .004379 2.000000 2 11.821134 .172642 11.360100 .3461034 .007499 4.000000 3 10.106008 .144709 9.765200 .346108 .010487 6.000000 4 9.005399 .136218 9.765200 .088101 .012407 6.000000 5 6.29328 .118659 8.482000 .188742 .013901 10.000000 7 7.399400 .07205 7.293400 .20639 .016914 15.000000 8 6.29328 .07205 7.053400 .20639 .02067 25.000000 9 6.52593 .07205 7.053400 .016381 .026379 6.000000 10 6.29538 .05765 6.15400 14638 .026393 50.00000 11 6.29538 .05765 6.15400 14638 .026393 50.00000 12 6.08939 .045800 14638 .026393 <	CASE NO. LABEL	PREDICTED	STD DEV OF PRED VALUE	OBSERVED COUNT	RESIDUAL	CASEWT	T IME		
. 172042 11.360100	· ·							· · · · · · · · · · · · · · · · · · ·	
172042 11.360100 461034 .007749 .144709 9.765200 340808 .010487 .136218 9.093500 .088101 .012093 .118659 8.482000 .188742 .013900 .070454 7.334200 .293690 .016914 .070454 7.334200 .20638 .02067 .072005 7.059300 .20638 .02067 .071352 6.704100 016185 .022249 .057665 6.155400 140538 .026393 .057665 6.155400 140538 .0264177 .05118 5.994000 140538 .03033 .042003 5.644000 079715 .031392 .042003 5.093800 153309 .034402 .0430814 4.599600 109798 .042135 .051932 4.366200 .05342 .05260 .059141 4.266800 100374 .05260	_	14.508458	.302010	15.11.00	. 503242	9/5400.	2.00000		
. 144709 9.765200 340808 010487 . 136218 9.093500 088101 012093 . 118659 8.482000 188742 013900 . 078204 7.689100 289700 016914 . 070454 7.33400 20638 02067 . 071352 6.704100 016185 022249 . 071352 6.704100 016185 022249 . 057665 6.431300 068831 02249 . 057665 6.155400 140538 027833 . 04203 5.994000 140538 027833 . 04203 5.644000 138595 031392 . 043086 4.871700 109798 038540 . 043086 4.360200 057172 049453 . 055065 4.360200 053142 052602	~	11.821134	.172042	11.360100	461034	.007749	4.000000		
.136218 9.093500 .088101 .012093 .118659 8.482000 .188742 .013900 .078204 7.589100 .289700 .016914 .0770454 7.334200 .293690 .016591 .077045 7.059300 .206638 .020067 .071352 6.704100 .068931 .022449 .057665 6.431300 .068931 .026393 .057665 6.155400 140538 .026393 .045842 5.644000 138595 .030039 .042003 5.644000 079715 .031392 .039683 5.391500 153309 .034402 .043086 4.871700 109798 .042135 .048814 4.599600 .016725 .049453 .055065 4.360200 .059342 .052600 .059141 4.266806 .150374 .052600		10.106008		9.765200	340808		6.00000		
. 118659 8.482000 . 188742013900078204 7.589100289700016914070454 7.334200293690016914070454 7.334200293690018591072005 7.05930020663802249071352 6.471300140538022490256570 6.4313001405380224902561830276177059400140538026393027833027833042003 5.6440001738595031392031392039683 5.391500109798038540039321 5.093800109798038540048814 4.599600016725049453055065 4.360200059342055928058141 4.266800100374054928	4	9.005399	.136218	9,093500	.088101	.012093	000000		
.078204 7.689100 .289700 .016914 .070454 7.334200 .293690 .018591 .072005 7.059300 .206638 .020067 .071352 6.704100 .016185 .022249 .055070 6.15400 165043 .026393 .05118 5.994000 1405043 .026393 .045842 5.644000 138595 .030039 .042003 5.644000 079715 .031392 .039321 5.093800 153309 .034402 .043086 4.871700 016844 .042135 .059332 4.360200 .055065 .05260 .055065 4.360200 .059342 .05260	S	8.293258	.118659	8.482000	.188742	.013900	10.00000		
.070454 7.334200 .293690 .018591 .072005 7.059300 .206638 .020067 .071352 6.704100 016185 .022249 .055070 6.431300 140538 .026393 .057665 6.155400 140538 .026393 .045842 5.769800 138595 .030039 .042003 5.644000 079715 .031392 .039321 5.093800 163798 .034402 .048814 4.599600 101684 .042135 .048814 4.599600 .016725 .049453 .055065 4.366806 .160374 .052608	9	7.399400	.078204	7.689100	. 289700		15.000000		
.072005 7.059300 .206638 .020067 .071352 6.704100 068831 .022249 .065070 6.431300 068831 .022177 .057665 6.155400 140538 .026393 .045812 5.994000 138595 .03033 .042003 5.644000 079715 .031392 .039321 5.093800 109798 .034402 .043086 4.871700 101079 .042135 .048814 4.599600 .016725 .049453 .051932 4.496800 .0551772 .05260 .055065 4.366800 .100374 .05260	7	7.040510	.070454	7.334200	. 293690	.018591	20.000000		
. 071352 6.704100016185022249 .065070 6.431300068831024177 .057665 6.155400140538026393 .045842 5.769800138595037039 .042003 5.644000079715031392 .039321 5.09380016340038540 .043086 4.871700109798038540 .0408814 4.599600108798042135 .051932 4.496800057172054953 .055065 4.360200100374054928	8	6.852662	.072005	7.059300	. 206638	.020067	25.000000		
1 .065070 6.431300 .068831 .024177 3 .057665 6.155400 .140538 .026393 3 .051118 5.994000 .138595 .030039 5 .045842 5.769800 .079715 .030039 5 .042003 5.644000 .079715 .031392 6 .039321 5.931500 .163309 .038540 7 .043086 4.871700 .016726 .042135 8 .043884 4.599600 .016726 .049453 8 .051932 4.496800 .057172 .049453 8 .055065 4.366800 .059342 .052600 6 .058141 4.266800 .100374 .052600		6.720285		6.704100	016185	.022249	30.00000		
3 .057665 6.155400 140538 .026393 3 .051118 5.994000 138595 .027833 5 .045842 5.769800 138595 .030039 6 .042003 5.644000 079715 .031392 9 .039321 5.093800 109798 .038540 10 .043086 4.871700 011684 .042135 10 .048814 4.496800 .057172 .049453 10 .055065 4.360200 .059342 .052600 10 .055065 4.366800 .100374 .052600	0	6.500131	.065070	6.431300	068831	.024177	40.000000		
.051118 5.994000 105043 .027833 .045842 5.769800 138595 .030039 .042003 5.644000 079715 .031392 .039321 5.391500 103798 .038540 .043086 4.871700 01684 .042135 .048814 4.596800 .057172 .049453 .055065 4.360200 .059342 .052600 .058141 4.266806 .100374 .05928	=	6.295938	.057665	6.155400	140538	.026393	50.00000		
. 045842 5.769800138595 .030039 .042003 5.644000079715 .031392 .039683 5.391500153309 .038540 .039321 5.093800109798 .038540 .042135 4.599600 .05172 .042135 .051932 4.360200 .059342 .052600 .058141 4.266800 .100374 .054928	7	6.099043		5.994000	105043	.027833	60.00000		
. 042003 5.644000079715 .031392 .039321 5.093800109798 .038540 .043086 4.871700011684 .042135 .048814 4.599600 .016725 .047267 .051932 4.360200 .059342 .052600	6	5.908395	.045842	5.769800	138595	.030039	70.000000		
. 039683 5.391500153309034402 .039321 5.093800109798038540 .043086 4.871700011684042135 .048814 4.599600016725042135 .051932 4.496800057172054953 .055065 4.36020005934205260	•	5.723715	.042003	5.644000	079715	.031392	80.00000		
.039321 5.093800109798 .038540 .043086 4.871700011684 .042135 .048814 4.599600 .016725 .047267 .051932 4.496800 .057172 .049453 .055065 4.360200 .059342 .052600	2	5.544809		5.391500	153309	.034402	90.00000		
. 043086 4.871700011684 . 042135 1 . 048814 4.599600 . 016725 . 047267 1 . 051932 4.496800 . 057172 . 049453 1 . 055065 4.360200 . 059342 . 052600 1 . 058141 4.266800 . 100374 . 054928 1	ø	5.203598	.039321	5.093800	109798	.038540	110.000000		
. 048814 4.599600 . 016725 047267 051932 4.496800 . 057172 049453 1 . 055065 4.360200 . 059342 . 052600 1 . 058141 4.266800 100374 054928	7	4.883384	.043086	4.871700	011684	.042135	130.000000		
.051932 4.496800 .057172 .049453 1 .055065 4.360200 .059342 .052600 1 .058141 4.266800 .100374 .054928 1		4.582875	. 048814	4.599600	.016725	.047267	150.00000		
.055065 4.360200 .059342 .052600 1 .058141 4.266800 .100374 .054928 1	5	4.439628	.051932	4.496800	.057172	.049453	160.000000		
.058141 4.266800 100374 054928 1	9	4.300858	:055065	4.360200	.059342	.052600	170.000000		
		4.166426	.058141	4.266800	100374	.054928	180.000000		

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PROGRAM REVISED FEBRUARY 1979 MANUAL DATE -- 1977

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IN THIS VERSION OF BMDP3R

- -- THE FORM OF SPECIFYING LINEAR CONSTRAINTS HAS BEEN CHANGED; SEE BMDP-77 MANUAL PAGE 480.
 -- COMPUTATIONS ARE NOW PERFORMED IN DOUBLE PRECISION.
 If YOU USE SUBROUTINE FUN BE SURE ALL FUNCTION REFERENCES ARE IN DOUBLE PRECISION.
 -- DEFAULT TOLERANCE FOR PIVOTING IS NOW .000000001.

PROGRAM TERMINATED NORMALLY.

DY (3) A = P(1) * X(1) IF (A - LE 0.0) F = 1.0/A + P(OF (2) = -1.0/A DF (1) = X(1) * D RETURN END IP FS. N* BMDP77.3RREL OLD*FTN. HEMGRY HEMGRY HEMGRY TITLE IS VARIABLES FORMAT IS IABLE RESS INDEPENDENT NUMBER IS NUMBER IS	
F = 1.0/A + P(DF(2) = -1.0/A DF(1) = X(1) + D RETURN END 1 IPFS. N+BMDP77.3RREL OLD+FTN. HEMGRY HEMGRY UT VARIABLES FORMAT IS IABLE RESS INDEPENDEN DEPENDENT DEPENDENT	
RETURN END 11 1PFS. N•BMDP77.3RREL OLD•FTN. HEMORY VARIABLES 1ABLE RESS INDEPENDENT DEPENDENT DEPENDENT NUMBER IS	
HEMORY. BLEM TITLE IS VARIABLES FORMAT IS IABLE NAMES ARE RESS INDEPENDENT DEPENDENT	
N+ BMDP77.3RREL OLD+FTN. HEMGRY BLEM TITLE IS ' VARIABLES FORMAT IS IABLE NAMES ARE RESS INDEPENDENT DEPENDENT DEPENDENT NUMBER IS	
OLD*FTN. WEMGRY BLEM TITLE IS VARIABLES FORMAT IS FORMAT IS NAMES ARE RESS INDEPENDENT DEPENDENT NUMBER IS	
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VARIABLES FORMAT 1S NAMES ARE THDEPENDEN DEPENDENT	
NAMES ARE THDEPENDEN DEPENDENT NUMBER IS	
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2. S. C.	
DARAMETERS ARE 3.	
0.01	
0 9.274 0 9.522 5.8 083	
10 7.296 10 7.518	
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I 51(.0) Subrout) ne parfun(f.Df.P.X.N.KASE.NVAR.NPAR.IP.XLOSS.ID) Impitctt double precision (a-H.O-Z)	COMMON/MEMORY/LENGTH, LEXICN, IB(15000) DIMENSION DF(NPAR), P(NPAR), X(NVAR) DF(3) = 1.0	A = P(1)+X(1) + P(2) IF(A.LE.O.O) A = 0.000001 F = 1.0/A + P(3)	DF(2) = -1.0/A++2. DF(1) = X(1)+DF(2) RETURN	END MANK 15002 COMMON		
######################################	் என்ன் மி			END FIN 66 IBANK 28 DBANK 15002 COMMON		

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#MAP.11 MAP 30R1 S74T11 09/14/82 14:51:37 START=032406, PROG SIZE(1/D)=19267/31281 SYS\$*RLIB\$, LEVEL 74R1A END MAP. ERRORS: 0 TIME: 19.478 STORAGE: 19840/6/040777/07777 **exot**

THE FORM OF SPECIFYING LINEAR CONSTRAINTS HAS BEEN CHANGED, SEE BMDP-77 MANUAL PAGE 480. COMPUTATIONS ARE NOW PERFORMED IN DOUBLE PRECISION. IF YOU USE SUBROUTINE FUN BE SURE ALL FUNCTION REFERENCES ARE IN DOUBLE PRECISION. DEFAULT TOLERANCE FOR PIVOTING IS NOW .00000001: PROGRAM REVISED FEBRUARY 1979 MANUAL DATE -- 1977 HEALTH SCIENCES COMPUTING FACILITY UNIVERSITY OF CALIFORNIA, LOS ANGELES COPYRIGHT (C) 1977, THE REGENTS OF THE UNIVERSITY OF CALIFORNIA 1000000 INITIAL ARE 0.01. 0.1. 5 TITLE IS 'INSULIN DATA' NAMES ARE STANDARD, COUNT INDEPENDENT IS STANDARD. DEPENDENT IS COUNT. VARIABLES ARE 2. FORMAT IS '(F6.0, F6.3)' PROBLEM TITLE INSULIN DATA PARAMETERS ARE 3. PROGRAM CONTROL INFORMATION NUMBER OF CASES TO READ IN. . NUMBER 15 2. BMDP3R - MONIINEAR REGRESSION TOTAL NUMBER OF VARIABLES IN THIS VERSION OF BMDP3R /PARAMETER /VARIABLE /REGRESS /PROBLEM /INPUT /END A-13

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(F6.0, F6.3) INPUT FORMAT

LIMITS AND MISSING VALUE CHECKED BEFORE TRANSFORMATIONS

INPUT UNIT NUMBER

BLANKS ARE. . .

ZEROS

STANDARD VARIABLES TO BE USED

2 COUNT

	PARAMETERS.	• • • • • • • • • • • • • • • • • • • •		m 6			
	FOR PIVOTING.	S. S		000000001000	0000		•
AXINUM NUFAXINUM NUF	MAXINUM NUMBER OF ITERATIONS. MAXINUM NUMBER OF INCREMENT HA	RATIONS.	LVINGS	50			
UMBER OF I	NUMBER OF DATA PASSES PER CÁSE COMPUTE LOSS FUNCTION	PER CASE		- ON			
USING THE A	ÁBOVÉ SPECT	FICATIONS	SPECIFICĀTĪDNS THIS PROGRAM CO	COULD PROCESS 2103 CASES	2103 CASES.		
NUMBER OF (CASES READ.	•	•	14		-	
VARIABLE NO. NAME		MEAN	STANDARD DEVIATION	MINIMUM	MAXIMUM		!
1 STANDARD 2 COUNT		55.714285 5.661286	69.637996	.000000	200.000000		
PARAMETER MAXIMA.	MAXIMA	•			****		
PARAMETER N	MINIMA	•	• • • • • • • • • • • • • • • • • • • •	*** *******	•	* * * * * * * * * * * * * * * * * * * *	
I TERAT I ON NUMBER	INCREMENT	RESIDUAL SUM OF SQUARES	:	P(1)	P(2)	P(3)	
.0	0	168.067703	37703	. 010000	100000	5.000000	
-	0	7.0	7.070963	.002958	.120812	1.312471	
7	0	e.	319398	.002667	.107692	.137569	
	0	.2.	249154	.002694	.108966	138173	
7	0	.2.	249144	.002694	108981	.138055	
ľU.	0	.2	249144	.002694	.108981	.138049	
9 1	0		.249144	.002694	108981	138049	
7	0		. 249144	.002694	108981	.138049	
80	0	.2	249144	.002694	.108981	.138049	
60	'n	.2	:	. 002694	108981	. 138049	•

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PARAMETERS
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CORRELAT
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V S

K. 5. 6.

			TOLERANCE	. 0942264330 1667719092 0466878333
1.0000	.0226494987	11	ASYMPTOTIC STANDARD DEVIATION	. 000220
1 1.0000 2 .7446 1.	RESIDUAL MEAN SQUARE	FREEDOM	ESTIMATE	. 108981
286	IDUAL ME	DEGREES OF FREEDOM	PARAMETER	585
3 3 3	RES	DEG	PAR	229

). 	ie Label	PREDICTED COUNT	STD DEV OF PRED VALUE	OBSERVE? COUNT	RESIDUAL	STANDARD	
_		9.313981	. 08801	9.274000	039981	000000	
~		9.313981	.088011	9.522000	. 208019	000000	
_	•	8.304731	056879	8.082000		2.000000	
_		8.304731	.056879	8.354000	.049269	5.000000	
		7.495495	.054245	7.296000	199495	10.000000	
.		7.495495	.054245	7.518000	.022505	10.00000	to the second se
_		5.809533	.066495	5.864000	.054467	25.000000	
_		5.809533	.066495	5.974000	. 164467	25.000000	
_		4.242118	.061842	4.396000	153882	50.00000	
_		4.242118	.061842	4.110000	132118	50.000000	
_		2.781170	.059201	2.830000	.048830	100.000000	
~		2.781170	059201	2.674000	. 107170	100.000000	ter der der der der der der der der der d
_		1.681973	.091104	1.798000	.116027	200.000000	
-		1.681973	.091104	1.566000	115973	200.000000	
I.A.	CORRELATION	42374					

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IN THIS VERSION OF BMDP3R

- THE FORM OF SPECIFYING LINEAR CONSTRAINTS HAS BEEN CHANGED, SEE BMDP-77 MANUAL PAGE 480; COMPUTATIONS ARE NOW PERFORMED IN DOUBLE PRECISION.

 IF YOU USE SUBROUTINE FUN BE SURE ALL FUNCTION REFERENCES ARE IN DOUBLE PRECISION.

 DEFAULT TOLERANCE FOR PIVOTING IS NOW .00000001. | |

PROGRAM TERMINATED NORMALLY.

BRKPT PRINTS

SUBPOUTINE PARFUN(F, DF, P, X, N) NUMPLICIT DOUBLE PRECISION (A COMMON/MEMORY/LENGTH, LEXICN, DIMENSION DI (N) = 1.000-DEXP(-P(2)*(X(3)-B) = 1.000-DEXP(-P(2)*(X(3)-P(2)*(X(3)-B) = 1.000-DEXP(-P(2)*(X(3)-P(2)*(X(3)-B) = 1.000-DEXP(-P(2)*(X(3)-P(2)*(X(1 #OLD.FIN.FIN, SI P3	RFUN	2
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END FTN 91 IBANK 33 DBANK 15002 COMMON

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MMAP.1 MAP 30R: S74T11 09/14/82 14:59:26 START=032154, PROG SIZE(1/D)=19113/31197 SYS\$*RLIB\$, LEVEL 74R1A END MAP. ERRORS: 0 TIME: 19.162 STORAGE: 19840/6/040777/07777 ●XQT

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SPECIFYING LINEAR CONSTRAINTS HAS BEEN CHAMGED, SEE BMDP-77 MANUAL PAGE PROGRAM REVISED FEBRUARY 1979 MANUAL DATE -- 1977 COMPUTATIONS ARE NOW PERFORMED IN DOUBLE PRECISION.

IF YOU USE SUBROUTINE FUN BE SURE ALL FUNCTION REFERENCES ARE IN DOUBLE PRECISION

DEFAULT TOLERANCE FOR PIVOTING IS NOW .00000001. TITLE IS 'AN EXAMPLE NONLINEAR REGRESSION -- H: SMITH .AN EXAMPLE NONLINEAR REGRESSION --- H ... SMITH PRODUCT RES ON TIME ELAPSED HEALTH SCIENCES COMPUTING FACILITY
UNIVERSITY OF CALIFORNIA, LOS ANGELES
COPYRIGHT (C) 1977, THE REGENTS OF THE UNIVERSITY OF CALIFORNIA 60 VARIABLES ARE 3. FORMAT IS '(F5.3,F5.1,F5.1)'; NAMES ARE CHLOR, CASEMI, TIME INITIAL ARE 0.30,0.02. IS'X CHLORINE/UNIT OF INDEPENDENT IS TIME.
DEPENDENT IS CHLOR.
PARAMETERS ARE 2.
MEIGHT IS CASEWT. HALVING IS 20 PROGRAM CONTROL INFORMATION REGRESS 10N IN THIS VERSION OF BMOP3R /VARIABLE TITLE -- THE FORM OF /REGRESS /PROBLEM PROBLEM TITLE /INPUT A-22

480.

. . . . 1000000 LIMITS AND MISSING VALUE CHECKED BEFORE TRANSFORMATIONS ZEROS REWIND INPUT UNIT PRIOR TO READING. . DATA. (F5.3, F5.1, F5.1) BLANKS ARE. INPUT UNIT NUMBER BLANKS ARE. . . INPUT FORMAT

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	. 456642	.002199	.460000	.003358	1.000000	12.000000	
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	.456642	.002199	.450000	006642	1.000000	12.000000	
_	. 456642	.002199	.430000	026642	1.000000	12.000000	
	.444410	.002537	.450000	.005590	1.000000	14.000000	
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9	. 434428	.002587	.430000	004428	1.000000	16.000000	
	.426282	.002465	.460000	.033718	1.000000	18.000000	
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ø	.419634	.002269	.420000	996000.	1.000000	20.000000	
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22	.414209	.002078	.410000	004209	1.000000	22.000000	
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	. 409782	.001959	.420000	.010218	1.000000	24.000000	
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32	. 403220	.002056	.400000	003220	1.000000	28.000000	
33	. 400814	.002246	.400000	000814	000000.	30.000000	
34	.400814	.002246	.400000	000814	1.000000	30.00000	
35	. 400814	.002246	.380000	020814	1.000000	30.000000	
36	. 398851	.002483	.410000	.011149	1.000000	32.000000	
37	, 398851	.002483	.400000	.001149	1.000000	32.000000	
38	. 397249	.002740	.400000	.002751	1.000000	34.000000	
39	. 395941	.002996	.410000	.014059	000000.1	36.000000	
•	. 395941	.002996	.380000	015941	1.000000	36.000000	
	.394874	.003241	.400000	.005126	1.000000	38.000000	
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9	.394003	.003468	390000	004003	1.000000	40.000000	
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UMDPDR - NONLINEAR REGRESSION
HEALTH SCIENCES COMPUTING FACILITY
UNIVERSITY OF SALIFORNIA, LOS ANGELES
COPYRIGH! (C) 1977, THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

TO SECURE A CONTROL OF THE PARTY OF THE PART

PROGRAM REVISED FEBRUARY 1979 MANUAL DATE -- 1977

IN THIS VERSION OF BMDP3R

-- THE FORM OF SPECIFYING LINEAR CONSTRAINTS HAS BEEN CHANGED, SEE BMDP-77 MANUAL PAGE 480. -- COMPUTATIONS ARE NOW PERFORMED IN DOUBLE PRECISION. IF YOU USE SUBROUTINE FUN BE SURE ALL FUNCTION REFERENCES ARE IN DOUBLE PRECISION. -- DEFAULT TOLERANCE FOR PIVOTING IS NOW .00000001.

PROGRAM TERMINĀTED NORMALLY.

PBRKPT PRINTS

A-26

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SUBROUTINE FUN(F,P,X,N,KASE,NVAR,NPAR,1P,XLOSS)
IMPLICIT DOUBLE PRECISION (A-M,Q-Z)
DIMENSION P(NPAR) X(NVAR)
F = P(1)+DEXP(P(2)+X(3))
+ P(3)+DEXP(P(4)+X(3))
RETURN
ETURN END FTN 47 IBANK 23 DBANK

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•MAP, I MAP 30R1 S74T11 09/14/82 15:13:14 START=032247, PROG S1ZE(1/D)=22560/32958 SYS\$+RLIB\$. LEVEL 74R1A END MAP. ERRORS: 0 TIME: 20.951 STORAGE: 19328/6/040777/076777 0x01

BMDPAR--DERIVATIVE-FREE NONLINEAR REGRESSION
HEALTH SCIENCES COMPUTING FACILITY
UNIVERSITY OF CALIFORNIA, LOS ANGELES
COPPRIGHT (C) 1977, REGENTS OF UNIVERSITY OF CALIFORNIA

PROGRAM REVISED OCTOBER 25, 1978 MANUAL DATE -- 1977

PROGRAM CONTROL INFORMATION

TITLE IS 'RADIOACTIVE SULFATE DATA'. VARIABLES ARE 3. FORMAT IS '(F8.4, F8.6, F8.0)'. NAMES ARE COUNT, CASEMT, TIME. DEPENDENT IS COUNT. PARAMETERS ARE 4. WEIGHT IS CASEWT. INITIAL ARE 10,1, 5,01.	/PROBLEM TITLE IS			/PARAMETER INITIAL
		ES ARE 3. IS '(F8.4,F8.6,F8.0)'.	RE COUNT, CASENT, TIME.	ARE 10,1, 5,01.

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(FB.4,FB.6,FB.0) INPUT FORMAT

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A-30

					002	002	500	600	003 003	600
	010000			4 P(4)	-1.100000-002 -1.000000-002		-1.339884-003 -4.083750-003	-2.907734-003 -2.907734-003	-2.973439-003 -3.013487-003 -3.234907-003	. , .
	507 CASES.	MAXIMUM	180.000000	3 P(3)	5.0000000+000 5.000000+000 5.000000+000	5.000000+000	5.023928+000 8.652810+000	7.156356+000 7.168310+000	7.23586+000 7.233586+000 7.339659+000 7.367586+000	7:363722+000
COUNT CASEWT 4 4 1.0-008 1.0-005 5	3 P(3)	MINIMUM	4.266800	2 P(2)	.100000-001	.000000-001	.004698-001 .668396-001	.731121-001	.911234-001 .092101-001	-2.157150-001
HALVINGS	2 P(2)	STANDARD DEVIATION	1.711865 60.915966 COMPUTED	PARAMETERS 1 P(1)	100000000000000000000000000000000000000	77	577	; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;	. 013788+001 . 018638+001 . 068700+001	<u> </u>
ERS. INTS. TERS. ITERATION INCREMENT	1 P(1) 10.000000 30VE SPECIFICAT	CASES READ	5.750701 97.93350 NOT	RESIDUAL SUM OF SQUARES	6.116146+000 1. 5.680315+000 1.	5.561265+000 1. 4.992196+000 1.		900	1.592020-002 1.565809-002 1.528276-002 1.306964-003	
REGRESSION NUMBER DEPENDENT VARIABLE NUMBER OF PARAMETE NUMBER OF CONSTRA TOLERANCE FOR PIVO TOLERANCE FOR CON MAXIMUM NUMBER OF MAXIMUM NUMBER OF	· · · · · ·	NUMBER OF CA Variable No. Name	1 COUNT 3 TIME 2 CASENT	ITER. INCR. NO. HALV.	000	• • •	-00		0 to 0 0	

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	7.374185+000	7.374536+000	7.377357+000	7.376182+000	7.374824+000	7.376315+000	7.379225+000	7.378816+000	7.378939+000	7.376521+000	7.378706+000	7.378854+000	7.379204+000	
	-2.275992-001	-2.276029-001	-2.282159-001	-2.292372-001	-2.286582-001	-2.28256-001	-2.201834-001	-2.291928-001	-2.292209-001	-2.294227-001	-2.293666-001	-2.293832-001	-2.294265-001	
	1.128930+001	1.129117+001	1.129724+001	1.130544+001	1.133493+001	1.133647+001	1.134889+001	1.134628+001	1.134661+001	1:135685+001	1.135295+001	1.135310+001	1:135461+001	
700 C41 CC4.	1.285337-002	1.285332-002	1.284938-002	1.284771-002	1.284682-002	1.284605-002	1.284564-002	1.284544-002	1.284543-002	1.284535-002	1.284533-002	1.284532-002	1.284531-002	
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-	1.135461+001 -2.294265-001 7.379204+000 -3.175618-003	ESTIMATE OF ASYMPTOTIC CORRELATION MATRIX	~	0000 5028 4187	51	ESTIMATES OF ASYMPTOTIC STANDARD DEVIATIONS OF PARAMETER ESTIMATES WITH	1 P(1) 2 P(2) 3 P(3) 4 P(4) 8.657886-001 1.873086-002 1.065936-001 1.362987-004	İ
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2 CASEWT		.007749	.010487		.013900	.016914	.018591	.020067	.022249	.024177	.026393	.027833	. 030039	.031392	.034402	.038540	.042135	.047267	.049453	.052600	05400
PREDICTED	.362641	171988	.144654	.136212	.118690	.078247	.070466	.072006	.071351	.065070	.057666	.051120	.045843	.042004	.039684		.043086	.048814	.051932	.055064	. 05B1A1
PREDICTED	14.508694	11.821485	10.106357	9.005700	8.293498	7.399515	7.040558	6.852678	6.720208	6.500127	6.295932	6.099035	5.908386	5.723705	5.544798	5.203585	4.883369	4.582859	4.439611	4.300841	A 166409
1 COUNT	15.111700	11.360100	9.765200	9.093500	8.4B2000	7.609100	7.334200	7.059300	6.704100	6.431300	6.155400	5.994000	5.769800		5.391500	5.093800		4.599600	4.496800	4.360200	A SASBOO
RESIDUAL	. 603006	461385	341157	.087800	. 188502	. 289585	. 293642	.206622	016188	068927	140532	105035	138586	079705	153298	109785	011669	.016741	. 057189	.059359	100001
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PROGRAM REVISED OCTOBER 25, 1978 MANUAL DATE -- 1977

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UMDPAR--DERIVATIVE-FREE NONLINEAR REGRESSION
HEALTH SCIENCES COMPUTING FACILITY
UNIVERSITY OF CALIFORNIA, LOS ANGELES
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PROGRAM TERMINATED NORMALLY.

BRKPT PRINTS

A-35

A. POSTO DE DESENTORA DESENTARA DESENTAR DESENTARA DESENTARA DE CONTROL DE CO

SUBROU IMPLIC DIMENS A = P(IM F(A L L F = 1. F = 1. RETURN END IN N-BMDP77 IN N-BMDP77 IN N-BMDP77 IN M-BMDP77 IN M-BMDP77 IN M-BMDP77 IN M-BMDP77 IN M-BMDP77 IN M-BMDP77 IN M-BMDR77 FLO EAD EAD	SUBROUTINE FUN(F,P.X,N,KASE,NVAR,NPAR,IP,XLUSS) IMPLICIT DOUBLE PRECISION (A-H,U-2) DIMENSION P(NPAR), X(NVAR) A = P(1) • X(1) + P(2) If A.LE.O.O) A = 0.000001 F = 1.0/A + P(3) RETURN END F\$. BMDP77.ARREL LD•FIN. MORY VARIABLES ARE 2. FORMAT 1S '(F6.0,F6.3)'.	
GRAP, I IN TP IN N LIB O IN ME ELO EXOT / PROBL	MENSION P(NPAR), X(NV MENSION P(NPAR), X(NV = P(1) • X(1) + P(2) = 1.0/A + P(3) 10RN DP77.AREL • FIN. RY TITLE IS 'INSULIN VARIABLES ARE 2. FORMAT IS '(F6.0,F	
SMAP, I IN TP IN N- LIB O IN ME ELO EXOT / PROBL	A A A A A A A A A A	
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	INITIAL ARE 0.01, 0.1, 5.	
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FIN BRIX *09/14/82-15:20(,0)

1. SUBROUTINE FUN(F,P.X.N.KASE,NVAR,NPAR,IP,XLOSS)

2. IMPLICIT DOUBLE PRECISION (A-H,Q-Z)

3. DIMENSION P(NPAR),X(NVAR)

4. A = P(1)*X(1) + P(2)

5. IF(A.LE.0.0) A = 0.000001

6. F = 1.0/A + P(3)

7. RETURN

8.

END FTN 40 IBANK 20 DBANK

#WAP, I MAP 30R; \$74T!! 09/14/82 15:20:13 START=032240, PROG SIZE(1/D)=22553/32955 SYS\$*RLIB\$. LEVEL 74R!A END MAP. ERRORS: 0 TIME: 20.962 STURAGE: 19840/6/040777/07777

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PROGRAM REVISED OCTOBER 25, 1978
MANUAL DATE -- 1977

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/PROBLEM TITLE IS INSULIN DATA'.	FORMAT IS '(F6.0, F6.3)'.	/REGRESS DEPENDENT IS COUNT.	/PARAMETERS ARE 3. /PARAMETER INITIAL ARE 0.01, 0.1, 5.	PROBLEM TITLE INSULIN DATA	ABLES TO READ IN	NUMBER OF CASES TO READ IN 1000000 CASE LABELING VARIABLES	GER ZEROS ERER

COUNT

VARIABLES TO BE USED 1 STANDARD

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3 P(3) 380460-001	RIX	P(3) 3	1.0000	2.2649-002	DEVIATIONS OF PARAMETER ESTIMATES WITH
	RELATION MATRIX	P(2) 2 P	1.0000		
THE RESIDUAL SUM OF SQUARES (= 1 P(1) 2.693592-003 1.089807-001	ESTIMATE OF ASYMPTOTIC CORRELATION	(1)4	1.0000 .7459 .9365	THE ESTIMATED MEAN SQUARE ERROR IS	ESTIMATES OF ASYMPTOTIC STANDARD
E RESIDUAL SUI 1 P(1) 2.693592-003	NATE OF ASYI		-00	ESTIMÁTED M.	MATES OF AS
1ME -	ESTII		P(1) P(2) P(3)	THE	ESTI

2.070125-003 1.863640-001

1 P(1) 2.202092-004 ---

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CASE No. Name	RESIDUAL	OBSERVED 2 COUNT	PREDICTED '	PREDICTED	1 STANDARD	
:	039980	9.274000	9.313980	.087987	. 000000	
~	.208020	9.522000	9.313980	.087987	000000	
m	222732	8.082000	8.304732	.056890	5.00000	
4	.049268	8.354000	8.304732	. 056890	5.000000	
S	199496	7.296000	7.495496	.054249	10.000000	
9	.022504	7.518000	7.495496	.054249	10.000000	
	.054465	5.864000	5.809535	.066492	25.000000	
6	.164465	5.974000	5.809535	.066492	25.000000	
o	. 153880	4.396000	4.242120	.061860	50.000000	
2	132120	4.110000	4.242120	.061860	50.000000	
=	.048828	2.830000	2.781172	.059216	100.000000	
12	107172	2.674000	2.781172	.059216	100.000000	
13	.116027	1.798000	1.681973	860160.	200.000000	
<u> </u>	115973	1.566000	1.681973	860160.	200.000000	

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MANUAL DATE -- 1977 BMOPAR--DERIVATIVE-FREE NONLINEAR REGRESSION
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THE STATE OF THE S

•MAP.1 MAP 30R1 S74T11 09/14/82 15:26:09 S1ART=032246, PROG S1ZE(1/D)=22559/32960 SYS\$+RLIB\$. LEVEL 74R1A END MAP. ERRORS: 0 TIME: 20.324 STORAGE: 19328/6/040777/076777

PXQT

41.

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PROGRAM CONTROL INFORMATION

TITLE IS 'AN EXAMPLE NONLINEAR REGRESSION - H. SMITH'. IS'% CHLORINE/UNIT OF PRODUCT RES ON TIME ELAPSED POPENDENT IS CHLOR.
PARAMETERS ARE 2.
WEIGHT IS CASEWT. VARIABLES ARE 3. FORMAT 1S '(F5.3,F5.1,F5.1)'. NAMES ARE CHLOR, CASENT, TIME INITIAL ARE 0.30,0.02. HALVING IS 20 /PARAMETER TITLE /VARIABLE /PROBLEM /REGRESS /INPUT

NUMBER OF VARIABLES TO READ IN.

NUMBER OF VARIABLES ADDED BY TRANSFORMATIONS.

TOTAL NUMBER OF VARIABLES

NUMBER OF CASES TO READ IN.

CASE LABELING VARIABLES

LIMITS AND MISSING VALUE CHECKED BEFORE TRANSFORMATIONS

BLANNS ARE.

INPUT UNIT NUMBER

REWIND INPUT UNIT PRIOR TO READING. DATA.

NO

INPUT FORMAT (F5.3,F5.1,F5.1)

VARIABLES TO BE USED

I CHLOR Z CASEWT

3 TIME

Z P(Z) 2 P(Z) 2 P(Z) 2 THIS PROGRAM COULD USE UP TO 649 CASES.	AM COULD USE UP TO 649	.030309 .380000 .490000 .9.650555 8.000000 1.000000 1.000000 1.000000	PARAMETERS 1 P(1) 2 P(2)	• •	. 303829	 • •	,328083 ,033833	• •	.358635 .046623	• •	
ETERS	ABOVE SPECIFICATION CASES READ	NAME MEAN CHLOR .425000 TIME 22.272725 CASENT NOT	INCR. RESIDUAL SUM HALV. OF SQUARES	0 .026315	0 .020475	3 010959	7 .010956		3 .009287		1

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1								
	3 PARAMETER VALUES						42 DEGREES OF FREEDOM ARE	
	5.001680-003') WAS SMALLEST'WITH'THE"FOLLOWING PARAMETER'VALUES"							
RES ON TIME ELAPSED	.001680-003) WAS SMAL		MATRIX			1.1909-004	IATIONS OF PARAMETER E	
X CHLORINE/UNIT OF PRODUCT	THE RESIDUAL SUM OF SQUARES (* 5	2 P(2) 01 1.016327-001	ESTIMATE OF ASYMPTOTIC CORRELATION M	P(1) P(2) 2	1.0000	THE ESTIMATED MEAN SQUARE ERROR IS	ESTIMATES OF ASYMPTOTIC STANDARD DEVIATIONS OF PARAMETER ESTIMATES WITH	1 P(1) 2 P(2) 44873-003 1.336034-002
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	000000	. 490000	. 490000	000000	1.000000	8.00000	
	.008368	.480000	.471632	.001419	1.000000	10.00000	
:	001632	.470000	.471632	611103.	1.000000	10.000000	
	.008368	.480000	.471632	.001419	1.000000	10.000000	
	001632	.470000	.471632	.001419	1.000000	. 0000001	
	.003358	.460000	. 456642	. 661200	000000.1	12.000000	
	.003358	.460000	. 456642	.002199	1.000000	12.000000	
	006642	.450000	.456642	.002199	1.000000	12.000000	
:	026642	.430000	.456642	. 002199	1.000000	12.000000	
	.005590	.450000	.444410	.002537	1.000000	14.000000	
	014410	.430000	. 444410	.002537	1.000000	14.000000	
	014410	.430000	. 444410	.002537	1.000000	14.00000	
	.005572	.440000	. 434428	.002587	1.000000	16.000000	
	004428	.430000	.434428	.002587	1.000000	16.000000	
 	004428	. 430000	.434428	.002587	000000. L	16.000000	
	.033718	.460000	. 426282	.002465	1.000000	18.000000	
	.023718	.450000	. 426282	.002465	1.000000	18.000000	
! ! !	996000.	.420000	.419634	.002269	1:000000	20.000000	
	.000366	.420000	.419634	.002269	1.000000	20.000000	
	.010366	.430000	.419634	.002269	1.000000	20.000000	
	004209	.410000	.414209	.002078	1.000000	22.000000	
	004209	.410000	.414209	.002078	1.000000	22.000000	
,	014209	.400000	.414209	.002078	1.000000	22.000000	
	.010218	.420000	.409782	.001959	1.000000	24.000000	
	009782	400000	. 409782	. 01959	1.000000	24.000000	
	009782	.400000	. 409782	.001959	1.000000	24.000000	
	. 003831	.410000	. 406169	.001951	1.000000	26.000000	
	006169	.400000	. 406169	.001951	1.000000	26.000000	
	.003831	.410000	. 406169	.001951	1.000000	26.000000	
:	.006780	.410000	.403220	.002056	1.000000	28.000000	
	003220	.400000	.403220	.002056	1.000000	28.000000	
	000814	.400000	. 400814	.002246	1.000000	30.00000	
:	000814	.400000		.002246	1.000000	30.00000	
	020814	.380000	. 400814	.002246	1.000000	30.000000	
	.011149	. 410000	. 398851	.002483	1.000000	32.000000	
1	. 001149	.400000	. 398851	.002483	1.000000	32.000000	
	.002751	.400000	.397249	.002740	1.000000	34.000000	
	.014059	.410000	. 395941	.002996	1.000000	36.000000	
	015941	. 380000		.002996	000000.1	36.00000	
	.005126	.400000	.394874	.003241	1.000000	38.000000	•
	.005126	.400000	.394874	.003241	1.000000	38.000000	ø
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SOURCES )'
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                                                                                                                                                         NAMES ARE PERF, HOLD, CASEWT, TIMEWI, 11, 12, 13, 14, 15.
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                                                                                                                      VARIABLES ARE 9.
FORMAT IS '(F6.2,F9.5,F12.5,F6.1,511X,F1.0))'
                                                                                                                                                                                                                                                                                                                                                                                                                                                                 FORMAT IS '(F6.2,F9.5,F12.5,F6.1,5(iX,F1.0))'
                                                                                                                                                                                                                                                                                            INITIAL ARE -20.0, 0.125,0.0,0.0,0.0,0.0,0.0.
eELT.L NLR.RUN/P3R77
ELTOT7 RLIB70 09/22-16:39:12-(3,)
0000001 001 ⊕RUN,X/NR P3R77,DLK7213030A/HOFMOCKEL-JL,PASS,6,100
000002 001 ⊕ASG,A PRT1.
0000003 001 ⊕USE PRT,PRT1
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                                                                                               TITLE IS ' REGRESSION ON REAL PI DATA'.
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                                                                                                                                                                                             INDEPENDENT IS PERF.
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NUMBER IS 2.
                                                                                                                                                                                                                                PARAMETERS ARE 7. WEIGHT IS CASEWT.
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                                                                                                                                                                                                                                                                                                                                                                                                                                                     VARIABLES ARE 8.
                                                                                                                                                                                                                                                                                                                                                       SIZE 1S 50,40.
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                                                                                                                                                                                                                                                                    HALVING IS 50
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                                                                                                                                                                                                                                                                                                                  RESIDUAL.
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                                                                                                                                                                                                                                                                                                                                                                          PADD, P NERDAT. A1
                                                                                                                                                                                                                                                                                                                                            NORMAL.
                                                                       @PASS+NLR. P3R77
                                                                                                                                                                                                                                                                                                                                                                                                     &PASS+NLH. P3R77
                                                            CPRX,U PRT.
                                                                                                                                                                                                                                                                                /PARAMETER
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PBRKPT PRINTS

PROGRAM REVISED FEBRUARY 1979 MANUAL DATE HEALTH SCIENCES COMPUTING FACILITY
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BMOP3R IN THIS VERSION OF

-- THE FORM OF SPECIFYING LINEAR CONSTRAINTS HAS BEEN CHANGED, SEE BMDP-77 MANUAL PAGE 480.
-- COMPUTATIONS ARE NOW PERFORMED IN DOUBLE PRECISION.
IF YOU USE SUBROUTINE FUN BE SURE ALL FUNCTION REFERENCES ARE IN DOUBLE PRECISION.
-- DEFAULT TOLERANCE FOR PIVOTING IS NOW .00000001.

PROGRAM CONTROL INFORMATION

SOURCES)' NAMES ARE PERF, HOLD, CASEWT, TIMEWT, 11, 12, 13, 14, 15. TITLE IS ' PARAMETERS FROM REAL DATA SET # 11 6 FORMAT 1S '(F6.2, F9.5, F12.5, F6.1, 5(1X, F1.0))' INITIAL ARE -20.0, 0.125,0.0,0.0,0.0,0.0,0.0 TITLE IS ' REGRESSION ON REAL PI DATA' INDEPENDENT IS PERF. DEPENDENT IS HOLD. WEIGHT IS CASEMT. ITERATIONS ARE 10 SNE B JUM(E F A,b" VARIABLE IS PERF. PARAMETERS ARE 7 ARE 9. SIZE 1S 50,40. HALVING 15 50. NUMBER 15 2 VARIABLES RESIDUAL. NORMAL. /PARAMETER /VARIABLE /PROBLEM /REGRESS /INPUT /PL01 /END

REGRESSION ON REAL PI DATA PROBLEM TITLE

LIMIIS AND MISSING VALUE CHECKED BEFORE TRANSFORMATIONS 1000000 ZERGS VARIABLES ADDED BY TRANSFORMATIONS. REWIND INPUT UNIT PRIOR TO READING. . DATA. NUMBER OF CASES TO READ IN. . . . CASE LABELING VARIABLES NUMBER OF VARIABLES TO READ IN TOTAL NUMBER OF VARIABLES INPUT UNIT' NUMBER BLANKS ARE. . NUMBER OF

(F6.2,F9.5,F12.5,F6.1,5(1X,F1.0)) INPUT FORMAT

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CASEWT 4 TIMEWT 14 15 15 15 VES VES NO
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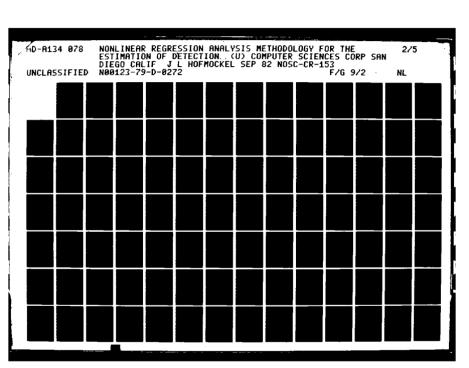
ITERATION 3 HAS THE SMALLEST RESIDUAL SUM OF SQUARES(SUBJECT TO CONSTRAINTS, IF ANY). TREMAINING CALCULATIONS ARE BASED ON THE RESULTS OF THIS ITERATION.

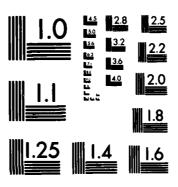
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-	.025732	.009322	.000000	025732	1576.688217	172.750000	154.000000	000000.
~	.015189	.0057	.009230	005959	6217.933044	174.250000	368.000000	000000
9	.008594	. 003533	000000.	008594	11097.099669	175.750000	374.000000	000000.
4	.004659	.002140	000000.	004659	14020.425049	177.250000	256.000000	000000
ı,	.002419	.001272	000000	002419	10276.506470	178.750000	95.00000	000000
(O)	.001202	.000734	000000	001202	9461.974609	100.250000	41.000000	000000
~ 0	.000572	۰.	000000	- 000572 - 00056	49520.144531	181.750000	109.000000	000000.
ם מ		917000	000000.	- 000260	42/47.1801/6	163.250000	40.000000	000000
n (E11000.		000000	- 000013	105581.185901	184.750000	44.000000	000000
	. 000047	.000053	000000	7,000047	13510 (8608	186.250000	33.000000	000000
	039385	012931	000000	034385	16.1.91782		20 00000	0000001
: E	.024112	.008141	.017020	007092	2518.737976	172.750000	233.00000	000000.1
14	.014157	.005080	000000	014157	10891.496826	174.250000	604.000000	1.000000
15	.007967	.003156	000000.	001967	4960.677673	175.750000	153.000000	1.000000
91	.004295	.001940	000000	004295	6381.263611	177.250000	105.000000	1.000000
17	. 002217	.001167	000000	062217		179.750000	22.000000	0000001
90	.001096	8/9000.	000000.	001096	3360 . 091309	180.250000	143.000000	1.000000
5	.000518	8/8000.	000000.	7.00051B	47883.120605	181.750000	95.000000	1.000000
	.000234		000000	.000234	49531.977539	183.250000	•	000000
17	.0000.	950000	00000	101000.1	513207.386719	184.750000	204.000000	000000
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25	.059238	.018386	0533800	030378	420.998589	169.750000	000000.16	000000
26	.037642	.012525	.026610	011032	88 1.28.3569	171.250000	124.000000	000000
27	.022953	.003203	000000	022953	1667.252350	172.750000	ഹ	000000
28	.013422	.005319	000000.	013422	1702.822600	174.250000	86.000000	.000000
29	.007522	.003398	000000.	007522	395.,.195038	175.750000	114.000000	000000
30	.00.1039	_	.000000	004039	6660.309934	177.250000	103.000000	000000.
31	.002076		000000.	002076	16425.033447	178.750000	132.000000	000000.
32	.001022	€	000000.	001032	41910.068164	180.250000	167.000000	000000
<u> </u>	.000481		000000.	000481	77013.278320	181.750000	144.000000	000000.
34	.000217	-	000000	000217	176708.335344	183.250000	149.000000	000000
35	.000093	.000105	000000	- 000003	********	184.750000	392.000000	000000
33	.000038	050000.	000000.	000038	457012.804688	186.250000	•	000000
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41	.085507	.012065	.076380	009127	1262.996460	174.250000	391.000000	000000
42	.056315	.008320	.043260	013055	1171.657166	175.750000	245.000000	000000
43	919260.	.007084	.000000	035616	188 628357	177.250000	255.000000	000000
44	.021613	005636	.00 3400	018213	2779.176056	178.750000	231.000000	.000000
45	.012576	.004282	000000.	012576	59%.934174	180.250000	25.000000	0000000
46	.007014	.003057	000000.	007014	2557.807617	181.750000	~	000000
47	.003747	.002043	000000	003747	3175.440887	183.250000	43.000000	000000
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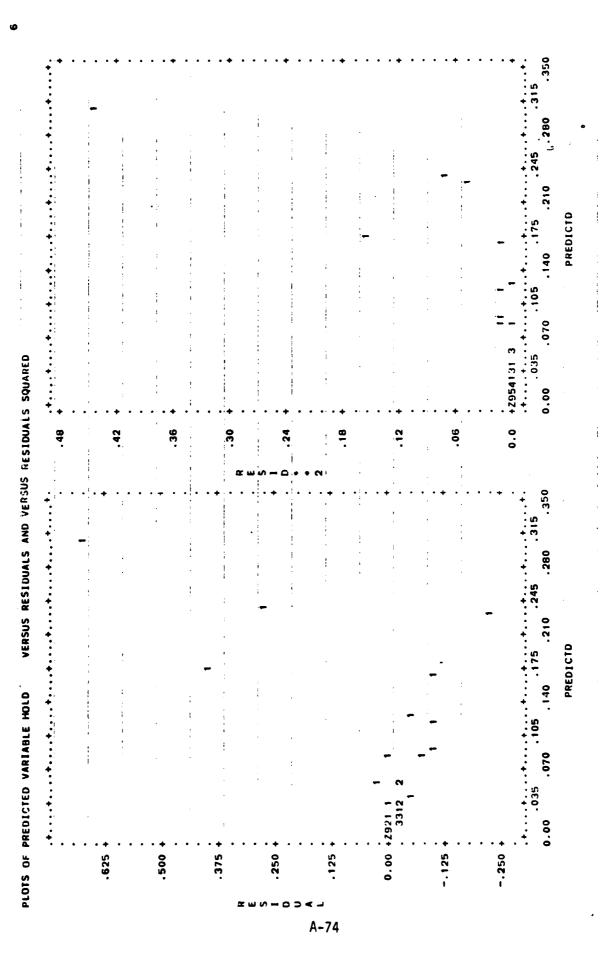


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PLOTS OF VARIABLE(1) VERSUS PREDICTED AND OBSERVED VARIABLE(2) AND VERSUS RESIDUALS.



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PROGRAM REVISED FEBRUARY 1979 MANUAL DATE -- 1977

IN THIS VERSION OF BMDP3R

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THE FORM OF SPECIFYING LINEAR CONSTRAINTS HAS BEEN CHANGED, SEE BMDP-77 MANUAL PAGE 480. COMPUTATIONS ARE NOW PERFORMED IN DOUBLE PHECISION. IF YOU USE SUBROUTINE FUN BE SURE ALL FUNCTION REFERENCES ARE IN DOUBLE PRECISION. DEFAUL! TOLERANCE FOR PIVOTING IS NOW .00000001.

PROGRAM TERMINATED NORMALLY.

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1977

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IN THIS VERSION OF BANDPAR

-- THE FORM OF SPECIFYING LINEAR CONSTRAINTS HAS BEEN CHANGED, SEE BMDP-77 MANUAL PAGE 480.
-- COMPUTATIONS ARE NOW PERFORMED IN DOUBLE PRECISION.
IF YOU USE SUBROUTINE FUN BE SURE ALL FUNCTION REFERENCES ARE IN DOUBLE PRECISION.
-- DEFAULT TOLERANCE FOR PIVOTING IS NOW .000000001.

PROGRAM CONTROL INFORMATION

TITLE IS ' PARAMETERS FROM REAL DATA SET # 2(5 SOURCES) VARIABLES ARE 8. FORMAT IS '(F6.2.F9.5,F12.5,F6.1,5(1X,F1.0))'. NAMES ARE PERF, HOLD, CASEWT, TIMEWT, 11, 12, 13, 14. INITIAL ARE -20.0, 0.125,0.0,0.0,0.0.0.0. TITLE 15 ' REGRESSION ON REAL PI DATA'. INDEPENDENT IS PERF. DEPENDENT IS HOLD.
NUMBER IS 2.
PARAMETERS ARE 6.
WEIGHT IS CASEWT.
ITERATIONS ARE 10. *SWE B JUW(E F A.b" VARIABLE IS PERF SIZE 1S 50.40 HALVING 15 50 RESIDUAL. NORMAL. /PARAMETER VARIABLE /PROBLEM /REGRESS /INPUT

DA FA . . . REGRESSION ON REAL PI PROBLEM TITLE

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(F6.2,F9.5,F12.5,F6.1,5(1X,F1.0)) INPUT FORMAT

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1 PERF					•	:		i : :	i :
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5	30	DEPENDENT 'ARIABLE	#E16++11	NIJAIBE . E	JUNDEY.	4	4	ī	×	8	3
ä	Z	쀨	끭	Ž	Ž	2	TOLERAN * LOR CONVERGENCE	젊	ž	Ē	8

USING THE ABOVE SPECIFICATIONS THIS PROGRAM COULD PROCESS 1116 CASES.

PADO, P NIRDAT. A2

2	VARIARIE	•	CIANDADO								
õ	NAME	MEAN	DEVIATION	MINIMOM	MAXIMUM	;	!	1	!	!	:
_	PERF	188.033289	2.274476	160.750000							
_	10r	.019983	.059401	000000						:	1
_	CASENT	215238.474609	**********	9.539320							
_	TIMEWT	189.973511	90.081268	2.000000							
۱۵	=	. 266483	.444909	000000		ı				•	
	12	.240860	. 430304	000000							
_	13	. 162466	.371205	000000.	1.000000						
_	4	. 163953	.372569	000000.		:					

PAHAWETER MAXIMA. .

•	(9)d	000000.	.344431	.506460	.682410	. 683404	. 683.104	.693404	. CB 3404	.683404
	P(5)	. 000000	-1.398860	924114	-1.043975	-1.044519	-1.044519	-1.044519	-1.044519	-1.044519
* ****	P(4)	.000000	1.163951	1.118125	1.172080	1.173642	1.173642	1.173642	1.173642	1.173642
	P(3)	000000	097137	.001243	.073468	.073758	.073758	.073758	.073759	.073758
** *********	2 2	.125000	C10508	.026536	. 048034	.048106	.040106	.048106	.048106	.048106
* * * * * * * * * * * * * * * * * * * *	h(1)	-20.000000	3.191612	-3.206475	-6.891854	-6.904092	-6.904092	-6.904092	-6.904092	-6 .904092
PARAJETER MINIMA	RESIDUAL SUM OF SQUARES	7598.075785	256.850921	71.037728	60.997416	60.997312	60.997312	60.997312	60.997312	60.997312
HINIMA	INCREMENT	0	7	0	•	7	50	43	43	44
PARAMETER !	ITERATION NUMBER	0	-	~	m	*	v	ø	7	4 .

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•	5 77			ANC	388 294 012	636 286 897
_	1.0000			ERANC	32388 31294 05012	96636 58286 40897
<u> </u>	0.61			OLERANC	0132388 0131294 1605012	1506638 2258286 7340897
ă	1			TOLERANCE	.0013238843	.9150663838 .2225828674 .6734089777
ă	į.			TOLERANC	.00132388 .00131294	.91506638 .22258286 .67340897
3) P(į.			TOLERANC	.00132388	.9150663E .2225828G .67340897
3 b(į.	31		:	.00132388	.9150663E .22258286 .67340893
e e	1.0000 .2052 .6413 .4354	0031		:	•••	:
P(3) P(į.	880031		:	•••	:
e e	į.	42880031		:	•••	:
e e	1.0000 .2052 .6413	8242880031		:	•••	:
e e	1.0000 .2052 .6413	.8242880031	74	:	•••	. 428620 . 91506638 . 138632 . 22258286 . 209826 . 6734089
e e	1.0000 .2052 .6413	.8242880031	74	:	•••	:
e e	1.0000 .2052 .6413	.8242880031	74	:	•••	:
e e	1.0000 .2052 .6413	.8242880031	74	:	•••	:
e e	1.0000 .2052 .6413	.8242880031	74	NOI	1,310879 ,007419 ,157829	. 428620 . 138632 . 209826
e e	1.0000 .0863 1.0000 0823 .2052 1738 .6413	.8242880031	74	ASYMPIGTIC STANDARD DEVIATION	1,310879 ,007419 ,157829	. 428620 . 138632 . 209826
e e	1.0000 .0863 1.0000 0823 .2052 1738 .6413	.8242880031	74	ASYMPIGTIC STANDARD DEVIATION	1,310879 ,007419 ,157829	. 428620 . 138632 . 209826
e e	1.0000 .0863 1.0000 0823 .2052 1738 .6413		74	ASYMPIGTIC STANDARD DEVIATION	1,310879 ,007419 ,157829	. 428620 . 138632 . 209826
1) P(2) P(3) 1	1.0000 .0863 1.0000 0823 .2052 1738 .6413			ASYMPIGTIC STANDARD DEVIATION	1,310879 ,007419 ,157829	. 428620 . 138632 . 209826
e e	1.0000 .0863 1.0000 0823 .2052 1738 .6413			:	1,310879 ,007419 ,157829	:
1) P(2) P(3) 1	1.0000 .0863 1.0000 0823 .2052 1738 .6413			ASYMPIGTIC STANDARD DEVIATION	1,310879 ,007419 ,157829	. 428620 . 138632 . 209826
1) P(2) P(3) 1	1.0000 .0863 1.0000 0823 .2052 1738 .6413			ASYMPIGTIC STANDARD DEVIATION	1,310879 ,007419 ,157829	. 428620 . 138632 . 209826
1) P(2) P(3) 1	1.0000 9958 1.0000 1553 .0863 1.0000 .05530823 .2052 .09401738 .6413 0724 .0203 .4354			ESTIMATE ASYMPTOTIC STANDARD DEVIATION	1,310879 ,007419 ,157829	. 428620 . 138632 . 209826
1) P(2) P(3) 1	1.0000 9958 1.0000 1553 .0863 1.0000 .05530823 .2052 .09401738 .6413 0724 .0203 .4354			ESTIMATE ASYMPTOTIC STANDARD DEVIATION	1,310879 ,007419 ,157829	. 428620 . 138632 . 209826
1) P(2) P(3) 1	1.0000 9958 1.0000 1553 .0863 1.0000 .05530823 .2052 .09401738 .6413 0724 .0203 .4354			ESTIMATE ASYMPTOTIC STANDARD DEVIATION	1,310879 ,007419 ,157829	. 428620 . 138632 . 209826
1) P(2) P(3) 1	1.0000 9958 1.0000 1553 .0863 1.0000 .05530823 .2052 .09401738 .6413 0724 .0203 .4354			ESTIMATE ASYMPTOTIC STANDARD DEVIATION	1,310879 ,007419 ,157829	. 428620 . 138632 . 209826
1) P(2) P(3) 1	1.0000 9958 1.0000 1553 .0863 1.0000 .05530823 .2052 .09401738 .6413 0724 .0203 .4354	HESIDUAL MEAN SQUARE . 8242880031	DEGREES OF FREEDOM 74	ASYMPIGTIC STANDARD DEVIATION	1) -6.904092 1.310879 2) .048106 .007419 .	. 428620 . 138632 . 209826

CASE 40. LABEL	PREDICTED HOLD	STD DEV OF PRED VALUE	OBSERVED	RESIDUAL	CASEMI	PERF	TIMEWI	Ξ
-	. 147924	.033209	109540	538384	43.901116	165.250000	17.000000	000000
٠ ١	131882		082220	049662		166.750000	900000	000000
ı m	.117083		000000	117083	2.1.470305	168.250000	3.00000	000000
4	. 103501	.023101	. 145,080	.041579		169.750000		000000
S	.091100	.020453	.061740	039360	597.039902	171.250000		000000.
9	.079837	.018135	. 134193	.054353	3.91911	172.750000	91.000000	000000
7	009690°		.056670	012390	148.641907	174.250000	34.000000	000000
c	.060512	.014372	.287790	. 226688		175.750000	•	000000
o	.052332	.012857	C86089.	. 03 1648	264.963097	177.250000	•	000000
2 =	. 0.15056	655110.	000000	045056	150.094263	178.750000	22.000000	000000
- 2	019960	10.000	00000		200000.00 200000.000	191 750000	000000	00000
V (**)	666250	008444	000000		318 116367	181.750000	30 000000	00000
) <u>-</u>	.023659	.007614	000000	023659	385.186905	184.750000		000000
51	116610.	. 006854	. 000000	116610		186.250000		000000
9	.016679	.006155	000000.	٠	2714.778778	187.750000	174.000000	000000.
2	.013906	.005507	000000	90610	1880.845184	189.250000		000000
.	.131541	.025852	. 2.43950	112419	90.784989	\sim	٠	1.000000
an g	.116769	.0226/4	081610	.035159	160.054844	166.750000	62.000000	000000.1
2.5	517501.	400610.	06357	166671.	E41 700707	100.052.001	000000.07	000000
- 0	0.20500	604710	046210	26/000.	447 461036	109.750000	198.00000	00000.
. C	. 069446	.013653	900000	069446	248.694006	172.750006		000000
7	. 060321	.012178	000000	- 060321	304.878063	174.250000	66.00000	000000
25	.052162	.010936	.045050	007112	279.831833	175,750000	51.000000	1.000000
92	.044905	188600.	000000.	044905		177.250000	100.00000	1.000000
2.7	.038483	.008972	0000000	038483	300.279362	178.750000	40.00000	1.000000
2	.032831	.008174	000000	032831	311.112306	180.250000	35.000000	000000.1
<u>ි</u>	.027882	.007458	000000.	027882	46-1. 695255	181.750000	46.000000	1.000000
0	.023570	208000	000000	023570	50-1.257336	183.250000	42.000000	1.0000000
23	.019834	.006191	000000	019834	63%.154533	184.750000	45.000000	1.000000
27.0	.016612	19500.	000000	016612 - 01266	1/01/62 : 40/0	-	38.00000	1.000000
7 9	0.000.00	00000	000000	000010	20010.00000 2000000000000000000000000000	187.750000	124.000000	000000.
35	. 004001	004892	000000	00400	1154.027786	124 250000	000000.682	00000
99	.003224	.004018	000000	003224	3683.747681	175.750000	43.00000	000000
37	.002585	.003286	000000	002505	864" . 54590	177.250000		000000
95	.002062		000000.	002062	21140.041846	178.750000	170.000000	000000
68	.001638	Ċ	000000.	- 001638	•	180.250000	183.00000	000000.
0.5	.001294		.003550	•	36887.501465	181.750000	•	000:000
- (.001018	.001405	000000	001018	81625.798828	183.250000		000000
Y (/6/000	52100	000000	/6/000·-	4901.9.10043	184.750000	00000000	000000.
7	179000	. 00000	000000		26/0FC : 05051	186.250000	•	000000.
Ţ	.000481	60/000	000000	- 0004B1	689''. 354065	167.750000	7.000000	000000
	565357	96.000	00000	•	· ;	189.250000	000000	000000
2 2	567075		000000	•	16.019491		•	900000
25	528420	- ~	000000	•		163 750000	5.000000 5.000000	00000
6	. 499657		993330	493673	61918	165.250000	•	00000
0.0	.470896		000000	- 470896		166.750000		000000
10	.442286	.041176	.660200	.217914	16.901711	168.250000	11.000000	000000
	.413974	.037363	.630000	.216026	21.850706	169.750000	16.000000	000000.
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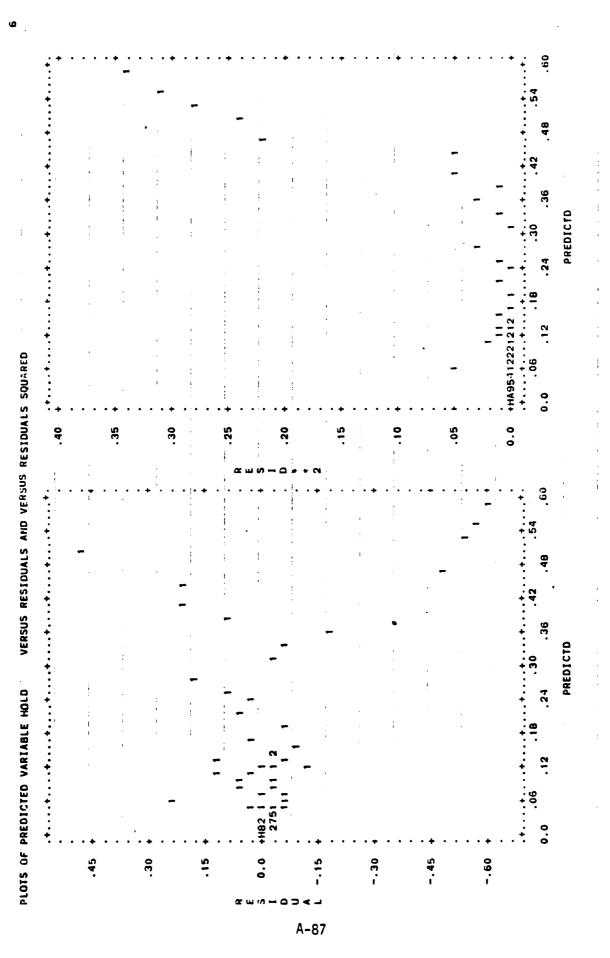
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171.250000 172.750000 174.250000 175.750000 177.250000 180.250000 181.750000 184.750000 187.750000 187.750000 171.250000 177.250000 177.250000 177.250000 178.750000 180.250000 180.250000 181.750000 181.750000 181.750000	
31, 449317 108, 854275 63, 445031 115, 445689 117, 696867 287, 251772 287, 251772 120, 750557 187, 322337 267, 994460 267, 994460 267, 994460 267, 994460 267, 994460 267, 994460 267, 994460 267, 994460 267, 994460 267, 994460 267, 994460 267, 994460 267, 99460 267, 99460 267, 99460 267, 99460 267, 99460 267, 99460 2692, 149719 7909, 039124	
. 094378 . 172026 . 074993 . 175401 . 078546 . 021344 . 075219 . 044281 . 044281 . 002514 . 002616 . 008628 . 0008628 . 0008628 . 0008628 . 0008628 . 0008628 . 0008628 . 0008628	
.480 180 .257220 .257220 .278200 .386300 .386300 .284530 .142070 .162070 .162070 .101080 .000000 .000000 .000000 .000000 .000000	41 000000 000000 000000 000000 000000 0000
.033698 .037248 .027240 .022612 .021148 .019508 .019508 .010657 .005648 .005648 .005667 .005667 .005667 .005667 .005667 .005667 .005667	© 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
.386102 .358406 .33213 .306439 .281589 .257754 .235010 .133422 .139351 .012964 .015319 .015319 .015319 .015319 .015319 .001335 .001336	21 000000000000000000000000000000000000
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SERIAL CORRELATION

1) VERSUS PREDICTED AND OBSERVED VARIABLE (2) AND VERSUS RESIDUALS.

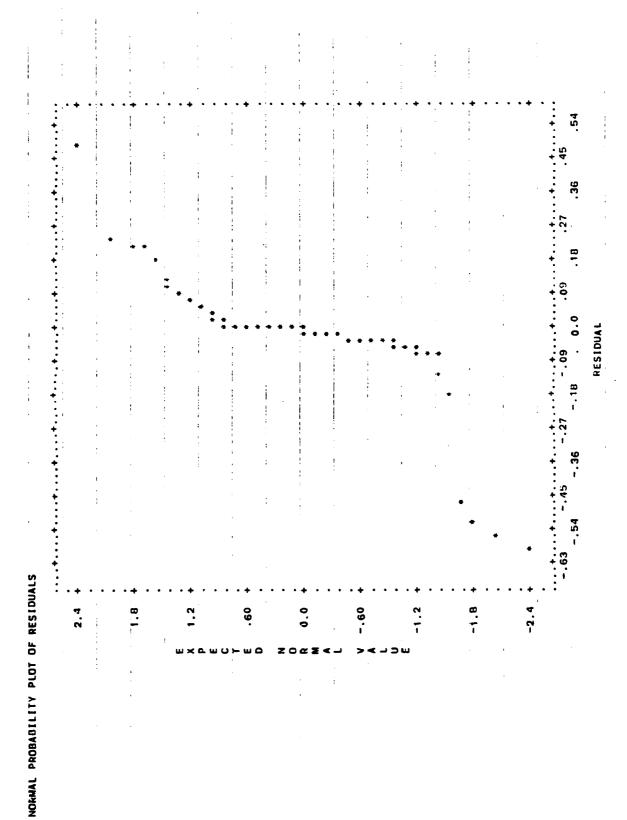
PLOTS OF VARIABLE



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PROGRAM REVISED FEBRUARY 1979 MANUAL DATE -- 1977

IN THIS VERSION OF BMDP3R

THE FORM OF SPECIFYING LINEAR CONSTRAINTS HAS BEEN CHAMGED, SEE BMDP-77 MANUAL PAGE 480. COMPUTATIONS ARE NOW PERFORMED IN UQUBLE PRECISION. IF YOU USE SUBROUTINE FUN BE SURE ALL FUNCTION REFERENCES ARE IN DOUBLE PRECISION. DEFAULT TOLERANCE FOR PIVOTING IS NOW .000000001. 1 1

PROGRAM TERMINATED NORMALLY.

A-89

PROGRAM REVISED FEBRUARY 1979 MANUAL DATE UMDP3R - NOW! INEAR REGRESEION
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1977

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IN THIS VERSION OF BMDP3R

SPECIFYING LINEAR CONSTRAINTS HAS BEEN CHANGED, SEE BMDP-77 MANUAL PAGE 480. -- COMPUTATIONS ARE NOW PERFORMED IN DOUBLE PRECISION.

1 YOU USE SUBROUTINE FUN BE SURE ALL FUNCTION REFERENCES ARE IN DOUBLE PRECISION.

-- DEFAULT TOLERANCE FOR PIVOTING IS NOW .00000001. THE FORM OF 1 1

PROGRAM CONTROL INFORMATION

SOURCES) NAMES ARE PERF, HOLD, CASEWT, TIMEWT, 11, 12, 13, 14. ភ ្ ĕ FURMAT IS '(F6.2, F9.5, F12.5, F6.1, 5(1X, F1.0)) TITLE IS ' PARAMETERS FROM REAL DATA SET " INITIAL ARE -20.0, 0.125,0.0,0.0,0.0.0.0. TITLE IS ' REGRESSION ON REAL PI DATA' INDEPENDENT IS PERF. DEPENDENT 15 HOLD. WEIGHT IS CASEWT. ITERATIONS ARE 10 NUMBER IS 2. Parameters are 6. .SWE B JUW(E F A,b" VARIABLE IS PERF. VARIABLES ARE 8. SIZE 1S 50,40. HALVING 15 50. RESIDUAL /PARAMETER /PROBLEM /REGRESS 4 /INPUF /PLOT

. REGRESSION ON REAL PI DATA PROBLEM TITLE

TRANSFORMATIONS 1000000 ZEROS NUMBER OF VARIABLES ADDED BY TRANSFORMATIONS. REWIND INPUT UNIT PRIDR TO READING. . DATA. LIMITS AND MISSING VALUE CHECKED BEFORE VARIABLES TO READ IN. NUMBER OF CASES TO READ IN. . TOTAL NICHBIR OF VARIABLES CASE LABELING VARIABLES INPUT UNIT MUMBER BLANKS ARE. . NUMBLR OF

(F6.2, F9.5, F12.5, F6.1, 5(1X, F1.0)) INPUT FORMAT

- •	PERF 12		2 HOLD 7 13		m m	3 CASENT 8 14	4 TIMENT 5	4	4 TIMENT	= :		S	=	:	į	;	;
VARIABLES TO BE PLOTTED 1 PERF	PLOTTED PERF				;	; ;		:			!			:		:	
PLOT OF PREDICTED VALUES VERSUS RESIDUALS NORMAL PROBABILITY PLOT	D VALUES VI TY PLOT .	ERSUS TY PLC	RESIDUALS	• • •	:	YES YES NO	!	•		:	:	i	:	!			į
	:	,	•	:	•			:			•	:	i	i		!	

VARIABLES TO BE USED

REGRESSION NUMBER INDEPENDENT VARIABLE	REGRESSION NUMBER		•	•	Ç.							
		- 1.109 804	-IN FUNCTION		PERF HO10	* * * * * * * * * * * * * * * * * * *		:		: : !	i	
WEIGHTING NUMBER OF	VARIABLE	• •	• •	• •	CASEWT 6	!				;		
NUMBER OF	NUMBER OF CONSTRAINTS . TOLERANCE FOR PIVOTING.				00010000000.	000						
TOLEHANCE	TOLEHANCE FOR CONVERGENCE	ENCE			0000100000			:				
MAXIMM NUMBER	MAXIMM NUMBER OF ITERATIONS NAXIMUM NUMBER OF INCREMENT	OF INCREMENT HALVINGS	LVINGS		200			;	i			
NUMBER OF COMPUTE LC	NUMBER OF DATA PASSES PER CASE. COMPUTE LOSS FUNCTION	PER CASE.			- g			; ;	•	;		
USING THE ABOVE	ABOVE SPECI	FICATIONS	SPECIFICATIONS THIS PROGRA	æ	COULD PROCESS	1116 CASES.		; ;	r r r			
PADO. P NLRDAT. A3	11.A3	i		; ;	•			:	* 1 · · · · · · · · · · · · · · · · · ·	1		
NUMBER OF	NUMBER OF CASES READ.	•	•	•	99				:	•	• 1	
VARIABLE NO. NAME	ž	MEAN	STANDARD DEVIATION	;	MINIMOM	MAXIMUM		:	:			
1 PERF	180	180.907249	3.718233	160	.750000	166.250000					-	
		.012998	1061371		000000.	726670	!					
4 TIMENT		155.281633	151.562706	7 -	000000	594.000000						
_	-	.171645	. 380006		0000000.	1.000000	•	:	1	:		
9 7		.287964	.456338		000000	1.000000						
. 6	-	.220145	.417569		000000	1.000000	•					
PARAMETER	MAXIMA	•	•		*	*** *******	***	*	•	•	•	•
PARAMETER	MINIMA	•	•	******	***	*** *******	* * * * * * * * * * * * * * * * * * * *	****	* * * * * * * * * * * * * * * * * * * *	• • • • • •	•	•
ITERATION NUMBER	INCREMENT HALVINGS	RESIDUAL SU	SUM	ă	-	P(2)	P(3)	6	4	a	9	(9)d
0	0	433.157671	17671	-20.00	.000000	.125000	.000000	ō.	000000	•	000000	000000
-	•	212.88	.884702	-6.93	935385	.048528	.471733	Ċ	285710	-	.710622	.446901
~ (0 (81.441831	441831	-13.09	.093203	. 684623	.756075		113337	7	.014663	.656335
	> 4	97.77	789029	10.45	.453603	104266	186126.	o.	011996	i	.945776	755/32
חניז	9 9	77.763029	9059		453503	. 104266	. 927957	5 0			945776	755732
9	20	77.78	. 789029	•	453602	.104266	.927957	•	-	· ;	945776	.755732
L (20	77.78	789029	-16.45	.453605	.104266	.927957		11956	i	.945776	.755732
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~	.138058	.036504	026.970.	058698	283.883095	168.250000	131.000000	000000
	. 106.177	. 023606	160150		93.386477	169.750000	29.000000	000000.
4	.080475	.023697	.062860	017615		171.250000	તં	000000
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, O r	.043202		.097340	.05.1138		174.250000	46.00000	000000.
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15	.021846	.013795	.014050	962200	167.1.426910	168.250000	139.00000	1.000000
16	.014874	.007386	.022240	.007366		169.750000	147.000000	1.000000
17	.009907	.006946	000000.	~.009907	•	171.250000	201.000000	1.000000
18	.006.155	.004784	.017750	.011295	5617.827820		140.000000	000000.1
19	.004113	.003230	000000	004113	8551.810181		136.000000	1.000000
20	.002563	.002137	000000	002563	- '	175.750000	56.00000	1.000000
21	.001561	. 001385	000000.	001561	•	177.250000	119.000000	1.000000
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41	.50521	.037245	.5315:00	.026279	5.2	166.750000		000000.
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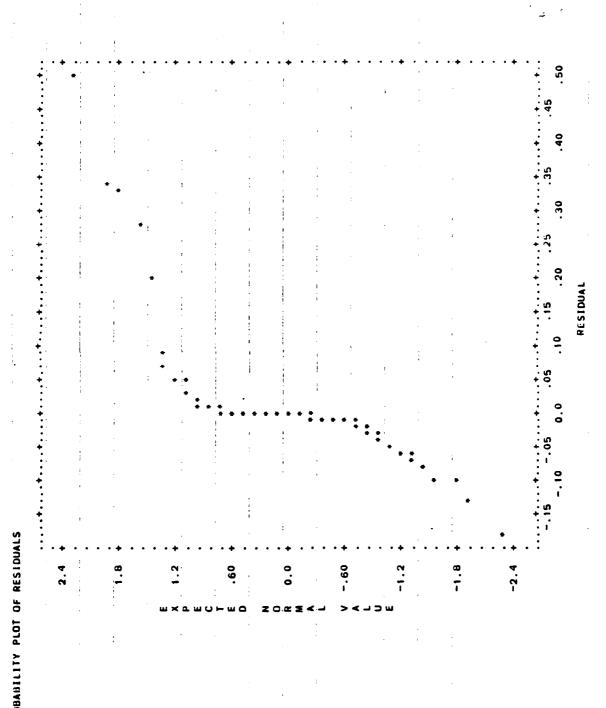
SERIAL CORRELATION

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UMDP3R - NONLINEAR REGRESSION
HEALTH SCIENCES COMPUTING FACILITY
UNIVERSITY OF CALIFORNIA, LOS ANGELES
COPYRIGHT (C) 1977, THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

PROGRAM REVISED FEURUARY 1979
MANUAL DATE -- 1977

IN THIS VERSION OF BMDP3R

THE FORM OF SPECIFYING LINEAR CONSTRAINTS HAS BEEN CHANGED, SEE BMDP-77 NANUAL PAGE 480. COMPUTATIONS ARE NOW PERFORMED IN DOUBLE PRECISION.

1F YOU USE SUBROUTINE FUN BE SURE ALL FUNCTION RFFERENCES ARE IN DOUBLE FRECISION.

DEFAULT TOLERANCE FOR PIVUTING IS NOW .00000001.

PROGRÁM TERMINATED NORMALLY.

BRKPT PRINTS

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                                                        VARIABLES ARE 8.
FORMAT IS '(FG 2,F9.5,F12.5,FG.1,5(1X,F1.0))'.
                                                                                                 TITLE IS ' PARAMETERS FROM REAL DATA SET # 3(
DEPENDENT IS HOLD.
HUMBER IS 2.
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                                                                                                                                                                               INITIAL ARE -20.0, 0.125,0.0,0.0,0.0,0.0.
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WEIGHT IS CASEWT.
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Variable is Perf
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	2-16:56:01-(0,) 6.75 67605 32,906:4 18.00	168.25 .07936 234.77729 131. 0 0	169.75 .16015 74.20759 29. 0 0	172.75 .04777 477.76903 115.00	174.25 .09734 288.48280 46.00 175.75 .03564 672.02929 75.00	177.25 .01386 2371.39636 178. 0 0	1/8./5 .00000 2594.21/13 125. 0 0 160.25 .00000 1648.51399 44. 0 0	181.75 .00000 3668.03201 59. 0 0	183.25 .00000 8789.76660 82.00	166.75 .03356 76.10590 49.10	168.25 .01405 248.66408 139. 1 0	169.75 .02224 333.38058 147. 1 0 . 171.25 .00000 598.16775 201. 1 0	172.75 .01775 577.91299 140. 1 0	174.25 .00000 802.33388 136. 1 0 . 175.75 .0000 511 56015 56 1 0	177.25 .00000 1603.64950 119. 1 0	178.75 .00000 6046.69366 288. 1 0	180.25 .00000 3208.00150 50.1 0 181.75 .00000 5458.56342 90.1 0	183.25 .00000 5541.48645 50. 1 0	184.75 .00000 2160.39270 5.1 0 172.75 .26057 237.84853 55.0 1	174.25 .11484 487.90275 81. 0 1	177.25 .01802 4102.94598 311. 0 1	178.75 .00000 12381.47009 594. 0 1	180.23 .00000 2830.33827 73. 0 1	183.25 .00000 15407.87964 147. 0 1	134.75 .00000 3092.65625 11. 0 1	160.75 .55639 153.11034 149. 0 0	162.25 .58716 110.60673 104. 0	163.75 .71858 92.07990 80. 0	166.75 .53150 104.47772 69. 0	168.25 .30882 111.69447 60.0	171.25 .60883 446.58243 149. 0	172.75 .60248 88.75602 17. 0	175.75 .10260 536.86532 59.0	177.25 .08953 3868.57300 293.0	178.75 .07786 2921.73505 137. 0	180.25 .00000 1952.55644 53.0	183.25 .00000 1523.35822 9.00	166.75 .00000 69.03726 44.00 (169.75 .01148 540.66393 241. 0
.A3	2-16:56:01-(0,) 6.75 67605 32,906:4 18.00	168.25 .07936 234.77729 131. 0 0	169.75 .16015 74.20759 29. 0 0	172.75 .04777 477.76903 115.00	174.25 .09734 288.48280 46.00 175.75 .03564 672.02929 75.00	177.25 .01386 2371.39636 178. 0 0	1/8./5 .00000 2594.21/13 125. 0 0 160.25 .00000 1648.51399 44. 0 0	181.75 .00000 3668.03201 59. 0 0	183.25 .00000 8789.76660 82.00	166.75 .03356 76.10590 49.10	168.25 .01405 248.66408 139. 1 0	169.75 .02224 333.38058 147. 1 0 . 171.25 .00000 598.16775 201. 1 0	172.75 .01775 577.91299 140. 1 0	174.25 .00000 802.33388 136. 1 0 . 175.75 .0000 511 56015 56 1 0	177.25 .00000 1603.64950 119. 1 0	178.75 .00000 6046.69366 288. 1 0	180.25 .00000 3208.00150 50.1 0 181.75 .00000 5458.56342 90.1 0	183.25 .00000 5541.48645 50. 1 0	184.75 .00000 2160.39270 5.1 0 172.75 .26057 237.84853 55.0 1	174.25 .11484 487.90275 81. 0 1	177.25 .01802 4102.94598 311. 0 1	178.75 .00000 12381.47009 594. 0 1	180.23 .00000 2830.33827 73. 0 1	183.25 .00000 15407.87964 147. 0 1	134.75 .00000 3092.65625 11. 0 1	160.75 .55639 153.11034 149. 0 0	162.25 .58716 110.60673 104. 0	163.75 .71858 92.07990 80. 0	166.75 .53150 104.47772 69. 0	168.25 .30882 111.69447 60.0	171.25 .60883 446.58243 149. 0	172.75 .60248 88.75602 17. 0	175.75 .10260 536.86532 59.0	177.25 .08953 3868.57300 293.0	178.75 .07786 2921.73505 137. 0	180.25 .00000 1952.55644 53.0	183.25 .00000 1523.35822 9.00	166.75 .00000 69.03726 44.00 (169.75 .01148 540.66393 241. 0
.A3	2-16:56:01-(0,) 6.75 67605 32,906:4 18.00	168.25 .07936 234.77729 131. 0 0	.16015 74.20759 29. 0 0	172.75 .04777 477.76903 115.00	.09734 288.48280 46.00 .03564 672.02929 75.00	177.25 .01386 2371.39636 178. 0 0	.00000 2694.21/13 126. 0 0 .00000 1648.51399 44. 0 0	181.75 .00000 3668.03201 59. 0 0	5 .00000 8789.76660 82.000	166.75 .03356 76.10590 49.10	168.25 .01405 248.66408 139. 1 0	.02224 333.38058 147. 1 0	172.75 .01775 577.91299 140. 1 0	.00000 802.33388 136. 1 0	177.25 .00000 1603.64950 119. 1 0	178.75 .00000 6046.69366 288. 1 0	.00000 3208.00150 90. 1 0	183.25 .00000 5541.48645 50. 1 0	.00000 2160.39270 5.1 U .26057 237.84853 55. O 1	111484 487.90275 81. 0 1	177.25 .01802 4102.94598 311. 0 1	5 .00000 12381.47009 594. 0 1	180.23 .00000 2830.33827 73. 0 1	183.25 .00000 15407.87964 147. 0 1	5 .00000 3092.65625 11. 0 1	160.75 .55639 153.11034 149. 0 0	162.25 .58716 110.60673 104. 0	5 .71858 92.07990 80.0 s 46889 59.14456 44.0	166.75 .53150 104.47772 69. 0	5 .30882 111.69447 60.0 5 72667 161 59447 69 0	171.25 .60883 446.58243 149. 0	2.75 .6024B 88.75602 17.0	175.75 .10260 536.86532 59.0	177.25 .08953 3868.57300 293.0	178.75 .07786 2921.73505 137. 0	0.25 .00000 1952.55644 53.0	183.25 .00000 1523.35822 9.00	75 .00000 69.03726 44.000	169.75 .01148 540.66393 241. 0
.A3	2-16:56:01-(0,) 6.75 67605 32,906:4 18.00	168.25 .07936 234.77729 131. 0 0	169.75 .16015 74.20759 29. 0 0	172.75 .04777 477.76903 115.00	174.25 .09734 288.48280 46.00 175.75 .03564 672.02929 75.00	177.25 .01386 2371.39636 178. 0 0	1/8./5 .00000 2594.21/13 125. 0 0 160.25 .00000 1648.51399 44. 0 0	181.75 .00000 3668.03201 59. 0 0	183.25 .00000 8789.76660 82.00	166.75 .03356 76.10590 49.10	168.25 .01405 248.66408 139. 1 0	169.75 .02224 333.38058 147. 1 0 . 171.25 .00000 598.16775 201. 1 0	172.75 .01775 577.91299 140. 1 0	174.25 .00000 802.33388 136. 1 0 . 175.75 .0000 511 56015 56 1 0	177.25 .00000 1603.64950 119. 1 0	178.75 .00000 6046.69366 288. 1 0	180.25 .00000 3208.00150 50.1 0 181.75 .00000 5458.56342 90.1 0	183.25 .00000 5541.48645 50. 1 0	184.75 .00000 2160.39270 5.1 0 172.75 .26057 237.84853 55.0 1	174.25 .11484 487.90275 81. 0 1	177.25 .01802 4102.94598 311. 0 1	178.75 .00000 12381.47009 594. 0 1	180.23 .00000 2830.33827 73. 0 1	183.25 .00000 15407.87964 147. 0 1	134.75 .00000 3092.65625 11. 0 1	160.75 .55639 153.11034 149. 0 0	162.25 .58716 110.60673 104. 0	163.75 .71858 92.07990 80. 0	166.75 .53150 104.47772 69. 0	168.25 .30882 111.69447 60.0	171.25 .60883 446.58243 149. 0	172.75 .60248 88.75602 17. 0	175.75 .10260 536.86532 59.0	177.25 .08953 3868.57300 293.0	178.75 .07786 2921.73505 137. 0	180.25 .00000 1952.55644 53.0	183.25 .00000 1523.35822 9.00	166.75 .00000 69.03726 44.00 (169.75 .01148 540.66393 241. 0
NLRDAT.A3	RLIB/O 09/22-16:56:01-(0,) 000 166.75	000 168.25 .07936 234.77729 131. 0 0	000 169.75 .16015 74.20759 29. 0 0	000 172.75 .04777 477.76903 115. 0 0	000 174.25 .09734 288.48280 46.00 0 000 175.75 .03564 672.02929 75.00	000 177.25 .01386 2371.39636 178. 0 0	9 000 1/8-75 ,00000 2594-21/13 126. 0 0 0 000 160.25 ,00000 1648-51399 44. 0 0	000 181.75 .00000 3658.03201 59. 0 0	000 183.25 .00000 8789.76660 82.0 0 0 000 186.25 .0000 14120.41931 36.0 0	000 166.75 .03356 76.10590 49. 1 0	000 108.25 .01405 248.66408 139. 1 0	169.75 .02224 333.38058 147. 1 0 . 171.25 .00000 598.16775 201. 1 0	000 172.75 .01775 577.91299 140. 1 0	9 000 174.25 .00000 802.33388 136. 1 0 0 0 0 175.75 75 0 0 0 0 175.75 75 1 0 0 0 0 0 175.75 75 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1 000 177.25 .00000 1603.64950 119. 1 0	2 000 178.75 .00000 6046.69366 288. 1 0	3 000 180.25 .00000 3208.00150 90. 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	000 183.25 .00000 5541.48645 50. 1 0	000 184.75 .00000 2160.39270 5.1 0 000 172.75 .26057 237.84853 55.0 1	000 174.25 .111484 487.90275 81. 0 1	000 177.2501802 4102.94598 311. 0 1	000 178.75 .00000 12381.47009 594. 0 1	000 181,75 .00000 2690,33837 42, 0 1	000 183.25 .00000 15407.87964 147. 0 1	000 134.75 .00000 3092.65625 11. 0 1	000 160.75 .55639 153.11034 149. 0 0	000 162.25 .58716 110.60673 104. 0	000 163.75 .71858 92.07990 80. 0	000 166.75 .53150 104.47772 69. 0	000 168.25 30882 111.69447 60. 0	4 000 171.25 .60883 446.58243 149. 0	000 172.75 .6024B 88.75602 17.0	000 175.75 ,10260 536.86532 59.0	000 177.25 .08953 3868.57300 293.0	9 000 178.75 .07786 2921.73505 137. 0	0 000 150.25 .00000 1952.55644 53.0	2 000 183.25 .00000 1523.35822 9. 0 0	3 000 166.75 .00000 69.03726 44. 0 0 0	4 000 168.25 .01549 127.26297 09. U
NLRDAT.A3	RLIB/O 09/22-16:56:01-(0,) 000 166.75	000 168.25 .07936 234.77729 131. 0 0	000 169.75 .16015 74.20759 29. 0 0	000 172.75 .04777 477.76903 115. 0 0	000 174.25 .09734 288.48280 46.00 0 000 175.75 .03564 672.02929 75.00	000 177.25 .01386 2371.39636 178. 0 0	9 000 1/8-75 ,00000 2594-21/13 126. 0 0 0 000 160.25 ,00000 1648-51399 44. 0 0	1 000 181.75 .00000 3668.03201 59.00	2 000 183.25 .00000 8789.76660 82. 0 0 3 000 186.25 .00000 14120.41931 36. 0 0	4 000 166.75 .03356 76.10590 49.10	5 000 1.8.25 .01405 248.66408 139. 1 0	6 000 169.75 .02224 333.38058 147. 1 0 0 0 0 171.25 .0000 598.16775 201. 1 0	8 000 172.75 .01775 577.91299 140. 1 0	9 000 174.25 .00000 802.33388 136. 1 0 0 0 0 175.75 75 0 0 0 0 175.75 75 1 0 0 0 0 0 175.75 75 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1 000 177.25 .00000 1603.64950 119. 1 0	2 000 178.75 .00000 6046.69366 288. 1 0	3 000 180.25 .00000 3208.00150 90. 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	000 183.25 .00000 5541.48645 50. 1 0	000 184.75 .00000 2160.39270 5.1 0 000 172.75 .26057 237.84853 55.0 1	000 174.25 .111484 487.90275 81. 0 1	000 177.2501802 4102.94598 311. 0 1	000 178.75 .00000 12381.47009 594. 0 1	000 181,75 .00000 2690,33837 42, 0 1	000 183.25 .00000 15407.87964 147. 0 1	000 134.75 .00000 3092.65625 11. 0 1	000 160.75 .55639 153.11034 149. 0 0	000 162.25 .58716 110.60673 104. 0	000 163.75 .71858 92.07990 80. 0	000 166.75 .53150 104.47772 69. 0	000 168.25 30882 111.69447 60. 0	4 000 171.25 .60883 446.58243 149. 0	000 172.75 .6024B 88.75602 17.0	000 175.75 ,10260 536.86532 59.0	000 177.25 .08953 3868.57300 293.0	9 000 178.75 .07786 2921.73505 137. 0	0 000 150.25 .00000 1952.55644 53.0	2 000 183.25 .00000 1523.35822 9. 0 0	3 000 166.75 .00000 69.03726 44. 0 0 0	4 000 168.25 .01549 127.26297 09. U
NLRDAT.A3	RLIB/O 09/22-16:56:01-(0,) 000 166.75	000 168.25 .07936 234.77729 131. 0 0	000 169.75 .16015 74.20759 29. 0 0	000 172.75 .04777 477.76903 115. 0 0	000 174.25 .09734 288.48280 46.00 0 000 175.75 .03564 672.02929 75.00	000 177.25 .01386 2371.39636 178. 0 0	000 1/8:75 .00000 2594:21/13 126: 0 0 000 160:25 .00000 1648:51399 44: 0 0	1 000 181.75 .00000 3668.03201 59.00	000 183.25 .00000 8789.76660 82.0 0 0 000 186.25 .0000 14120.41931 36.0 0	4 000 166.75 .03356 76.10590 49.10	5 000 1.8.25 .01405 248.66408 139. 1 0	000 169.75 .02224 333.38058 147.1 0 000 171.25 00000 598.16775 201.1 0	8 000 172.75 .01775 577.91299 140. 1 0	000 174.25 .00000 802.33388 136.1 0 .	1 000 177.25 .00000 1603.64950 119. 1 0	2 000 178.75 .00000 6046.69366 288. 1 0	000 180.25 .00000 3208.00150 90.1 0	000 183.25 .00000 5541.48645 50. 1 0	184.75 .00000 2160.39270 5.1 0 172.75 .26057 237.84853 55.0 1	000 174.25 .11484 487.90275 81. 0 1	000 177.25 .01802 4102.94598 311. 0 1	000 178.75 .00000 12381.47009 594. 0 1	000 181,75 .00000 2690,33837 42, 0 1	000 183.25 .00000 15407.87964 147. 0 1	134.75 .00000 3092.65625 11. 0 1	000 160.75 .55639 153.11034 149. 0 0	000 162.25 .58716 110.60673 104. 0	163.75 .71858 92.07990 80. 0	000 166.75 .53150 104.47772 69. 0	000 168.25 30882 111.69447 60. 0	4 000 171.25 .60883 446.58243 149. 0	172.75 .60248 88.75602 17. 0	000 175.75 ,10260 536.86532 59.0	8 000 177.25 .08953 3868.57300 293.0	9 000 178.75 .07786 2921.73505 137. 0	000 180.25 .00000 1952.55644 53.0	2 000 183.25 .00000 1523.35822 9. 0 0	000 166.75 .00000 69.03726 44. 0 0	4 000 168.25 .01549 127.26297 09. U
.A3	RLIB/O 09/22-16:56:01-(0,) 000 166.75	000 168.25 .07936 234.77729 131. 0 0	000 169.75 .16015 74.20759 29. 0 0	5 000 172.75 .04777 477.76903 115. 0 0	000 174.25 .09734 288.48280 46.00 0 000 175.75 .03564 672.02929 75.00	000 177.25 .01386 2371.39636 178. 0 0	9 000 1/8-75 ,00000 2594-21/13 126. 0 0 0 000 160.25 ,00000 1648-51399 44. 0 0	1 000 181.75 .00000 3668.03201 59.00	2 000 183.25 .00000 8789.76660 82. 0 0 3 000 186.25 .00000 14120.41931 36. 0 0	4 000 166.75 .03356 76.10590 49.10	5 000 1.8.25 .01405 248.66408 139. 1 0	6 000 169.75 .02224 333.38058 147. 1 0 0 0 0 171.25 .0000 598.16775 201. 1 0	8 000 172.75 .01775 577.91299 140. 1 0	9 000 174.25 .00000 802.33388 136. 1 0 0 0 0 175.75 75 0 0 0 0 175.75 75 1 0 0 0 0 0 175.75 75 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1 000 177.25 .00000 1603.64950 119. 1 0	000022 000 178.75 .00000 6046.69366 288. 1 0	0000024 000 180.25 .00000 3208.00150 90.1 0 0000024 000 181.75 .00000 5458.56342 90.1 0	000 183.25 .00000 5541.48645 50. 1 0	000026 000 184.75 .00000 2160.39270 5.1 0 000027 000 172.75 .26057 237.84853 55.0 1	000 174.25 .111484 487.90275 81. 0 1	000 177.2501802 4102.94598 311. 0 1	000 178.75 .00000 12381.47009 594. 0 1	000 181,75 .00000 2690,33837 42, 0 1	000 183.25 .00000 15407.87964 147. 0 1	000 134.75 .00000 3092.65625 11. 0 1	000 160.75 .55639 153.11034 149. 0 0	000 162.25 .58716 110.60673 104. 0	000 163.75 .71858 92.07990 80. 0	000 166.75 .53150 104.47772 69. 0	000 168.25 30882 111.69447 60. 0	4 000 171.25 .60883 446.58243 149. 0	000 172.75 .6024B 88.75602 17.0	000 175.75 ,10260 536.86532 59.0	000 177.25 .08953 3868.57300 293.0	9 000 178.75 .07786 2921.73505 137. 0	0 000 150.25 .00000 1952.55644 53.0	2 000 183.25 .00000 1523.35822 9. 0 0	3 000 166.75 .00000 69.03726 44. 0 0 0	4 000 168.25 .01549 127.26297 09. U

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BRRKPT PRIF

PROGRAM REVISED OCTOBER 25, 1978
MANUAL DATE -- 1977

UNDPAR--DERIVATIVE-FREE NONLINEAR REGRESSION
HEALTH SCIENCES COMPUTING FACILITY
UNIVERSITY OF CALIFORNIA, LOS ANGELES
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PROGRAM COUTROL INFORMATION

+SWE B JUW(E F A+R"

TITLE IS ' PARAMETERS FROM REAL DATA SET # 1(& SOURCES)' NAMES ARE PERF, HOLD, CASEWT, TIMEWT, 11, 12, 13, 14, 15. VARIABLES ARE 9. FORMAT IS '(F6.2,F9.5,F12.5,F6.1,5(1X,F1.01)'. INITIAL ARE -20.0, 0.125,0.0,0.0,0.0,0.0.0.0. TITLE IS ' REGRESSION ON REAL PI DATA'. DEPENDENT IS HOLD. PARAMETERS ARE 7. WEIGHT IS CASEWT. ITERATIONS ARE 50 HALVING IS 20. VARIABLE IS PERF. SIZE 1S 50,40. NUMBER 15 2. RESIDUAL. /PARAMETER /VARIABLE /PROBLEM /REGRESS /INI-UI /PLOT /END

PROBLEM 11TLE REGRESSION ON REAL PI DATA

INPUT FOAMAT (FE.2,F9.5,F12.5,F6.1,5(1X,F1.0))

TIMENT

VARIABLES TO BE PLOTTED 1 PERF

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REGRESSION TILLE

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PARAMETERS FROM REAL DATA SET # 1(6 SOURCES)

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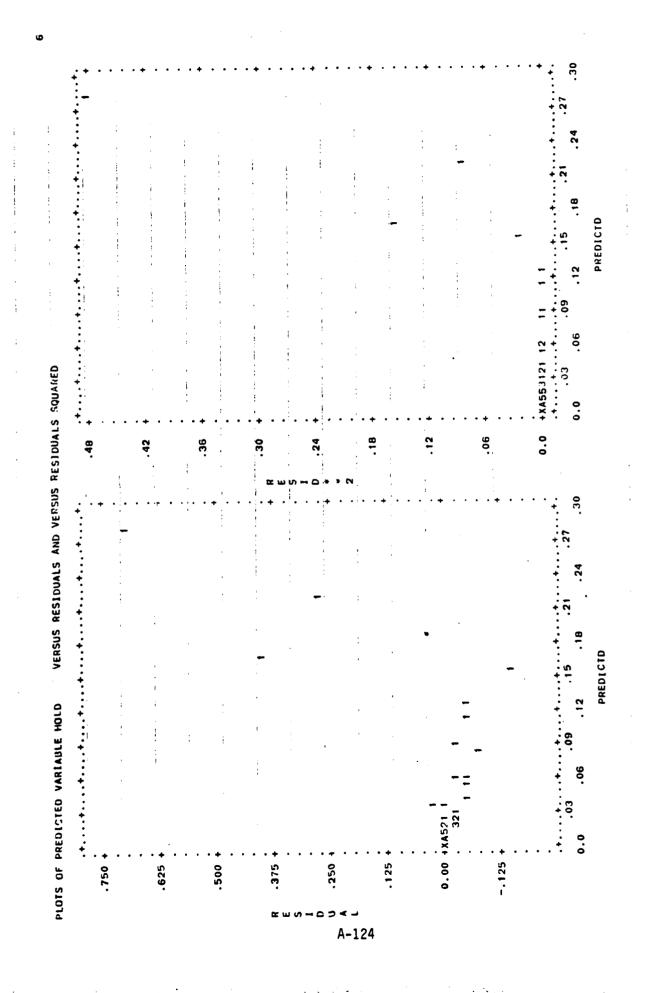
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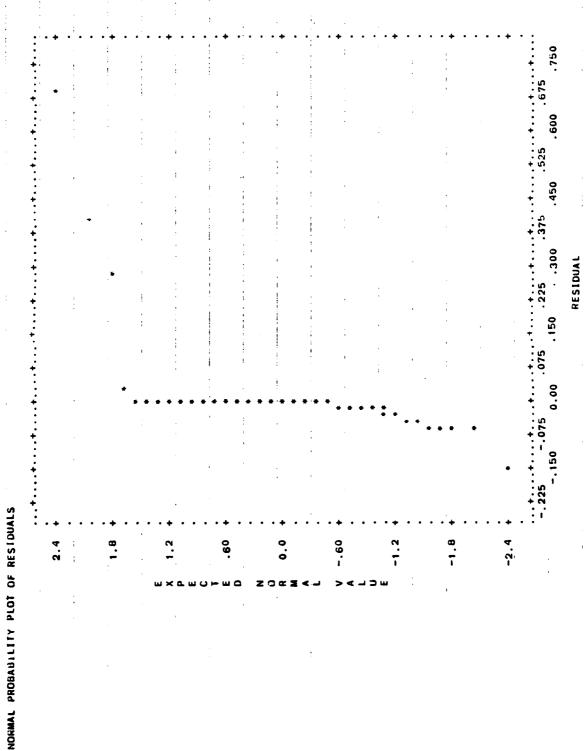
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MEALTH SCIENCES COMPUTING FACILITY
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PROGRAM REVISED OCTUBER 25, 1978 MANUAL DATE -- 1977

PROGRAM TERMINATED NORMALLY.

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PROGRAM CONTROL INFORMATION

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TITLE IS ' PARAMETERS FROM REAL DATA SET " 2( 5 SOURCES )'.
DEPENDENT IS HOLD.
NUMBER IS 2.
PARAMETERS ARE 6.
WEIGHT IS CASEWT.
ITERATIONS ARE 50.
HALVING IS 20.
                                                                      VARIABLES ARE 8. FORMAL IS '(F6.2,F9.5,F12.5,F6.1,5(1X,F1.0))'.
                                                                                                                          NAMES ARE PERF, HOLD, CASEWT, TIMEWT, 11, 12, 13, 14.
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                                   TITLE IS ' REGRESSION ON REAL PI DATA'.
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PROBLEM TITLE REGRESSION ON REAL PI DATA

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REGRESSION NUMBER	DEPENDENT VARIABLE	WEIGHTING VARIABLE	NUMBER OF PARAMETERS	NUMBLE OF CONSTRAINTS	ĭ	Ξ	MAXILIM NULIBER OF ITERATIONS	KAXIMIM NUMBER OF INCREMENT HALVINGS
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PARAMETERS TO BE ESTIMATED

286 CASES. USING THE ABOVE SPECIFICATIONS THIS PROGRAM COULD USE UP TO

FADD, P HURDAT. A2

VAR	VARIABLE		STANDARD			:	
Š	NO. 11/13E	MEAN	DEVIATION	MIN I MUSI	MAXIMUM		
-	PERF	188.033289	2.27.1476	160.750000	169.250000	•	
~	HOLD	.019983	.050401	000000	. 993330		
4	FINEW	169.973511	90.081267	2.000000	378.000000		
ß	=	. 266483	.44.1909	000000	1.000000	i :	
φ	12	.240860	. 430304	0 00000.	1.000000		
1	13	. 162466	.371205	000000	1.000000		
9	4	. 163953	.372569	000000	1.000000		
n	CASEWI	NOT	COMPUTED	9.599320	398959,062500		
ITER.		RESTOUAL SUM	PARAMETERS				
₹9	HALV.	UF SQUARES	1 P(1)	. 2 P(2)	3 P(3)	4 P(4)	S P(S
0	•	********	-20.000000	.137500	000000	000000.	000
0	9	7865.873238	-20.000000	.125000	000000	000000	٥
0	0	7598.107425	-20.000000	.125300	.01000	000000	0
0	0	7598.075785	-20.00000	.125000	.000000	000000	000
0	•	7598.032581	-20.00000	.125000	000000.	.010000	0
c	0	7597.847925	-20.000000	.125000	000000.	000000	00.
0	0	1587.202636	-22.000000	125000	000000	000000	Č

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377.716611	-21.824755	.129600	020728	. 573502	683475	127897
313.377616	-21.820119	.129623	173918	. 586267	447491	. 354446
274.250997	-21.543755	. 128943	.217537	. 426359	513418	. 495059
267.285003	-21.284307	.128292	. 120976	.342957	604114	. 496571
261.105708	-21.361317	, 128464	115174	.477151	611853	. 486254
260.766243	-21.382887	.128527	.109800	.472192	614041	. 494487
19H.606107	-20.409695	.125715	.240839	.338422	-1.421446	.374773
183.946307	-20.279506	.125408	16921	.321624	-1.322246	. 382899
183.945487	-20.282875	.125417	. 199460	.321121	-1.320916	. 382324
183.526144	-20.292251	. 125437	.218030	.370343	-1.302058	. 422358
183.511007	-20.298709	.125455	216916	.366371	-1.300580	. 419446
183.164171	-20.376807	.125050	.250123	.427478	-1.255590	. 437760
182.450683	-20.448200	.125740	.349177	1.165108	-1.182187	.871410
186.417215	-20.435764	.125729	.351618	1.025808	-1.221153	. 844593
180.205745	-20.485724	.125339	.375803	.880442	-1.190755	. 84.1010
186.203445	-20.479503	.125876	. 373684	.906110	-1.194327	.847991
179.936115	-20.424247	. 125713	. 344602	. 936953	-1.242731	.820342
179.767346	-20.426886	.125760	. 339142	. 8001.16	-1.251920	.836267
179.787329	-20.427232	.125763	339062	. 794231	-1.252039	.836291
179.787197	-20.427076	. 125761	1339091	. 197727	-1.251977	.836434
179.786704	-20.429496	.125773	. 339576	. 780369	-1.250954	.836747
179.786470	-20.429092	.125770	. 339588	.784319	-1.251065	.836749
179.785606	-20.428147	. 125769	. 338846	. 776363	-1.251618	. 836359

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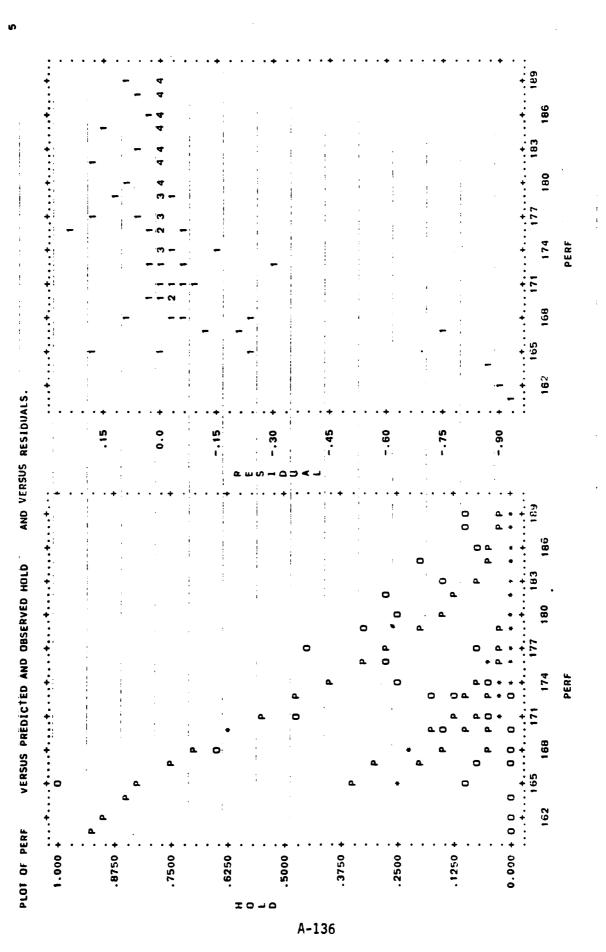
ESTIMATES OF ASYMPTOTIC STANDARD DEVIATIONS OF PARAMETER ESTIMATES WITH

74 DEGREES OF FREEDOM ARE

CASE NO. NAME	RESIDUAL	OBSERVEU 2 HOLD	PREDICTED 2 HOLD	SID. DEV. PREDICTED	1 PERF	3 CASEWT	4 IIMEWI	11 9
-	251671	. 109540	.361211	.110028	164.250000	23.981393	17.000000	000000
~	211042	.082220	. 293202	.091574	16". 750000	15.012445	6.000000	000000
.	231922	000000	. 231922	. 674490	c, i	14.200582	3.000000	000000.
47 1	033396	.145080	178476	86/663	161.750000	79.150329	42.000000	000000
	071794	.001740	133534	030960	171.250000	423.683548 924 E94729	000000.261	00000
·	011818	056670	. 068488	.030552	174.250000	150.995138	000000.4E	000000
- 33	.240312	.287200	.046888	.624147	175.750000	210.060556	33.000000	000000
6	.055851	.086980	.031129	.018702	177.250000	442.273151	•	000000.
0	020031	000000	.020031	.014077	178.750000	342.1.10671	22.000000	.000000
= :	012488	000000	.012488	.010240	180.256600	252.301575	6.000000	000000
2 5	007541	000000	007541	. C07174	181.750000	1517.676895	30 000000	000000
2 4	002495	000000	. 002495	.003128	184.750000	3575.605864	31.000000	000000
5	001366	000000	.001366	.C01944		25062.039795	137.000000	000000
91	000724	000000	.000724	191100	187.750000	61507.805664	174.000000	000000
1.1	000371	000000	.000371	9990000	189.250000	69575.790039	000000.66	000000
9 9	.000141	.243960	. 243819	261945	165.250000	56.251160	37.000000	1.000000
2 f	10/082	081610	188692	554500.	1611 250000	163.611536	26.000000	000000
	108.40	147630	PC8501	635739	169.750000	542.950401	198 000000	000000
33	027503	0.16210	.073713			480.126144	127.000000	1.000000
23	0507B0	000000	.050780	.020739	172.750000	333.424789	60.00000	1.000000
24	033926	000000	.033926	.014980	÷,	535.918846	000000.99	1.000000
52	.023079	. 0.15050	.021971	610112	173.756000	643.851852	21.000000	1.000000
26	013787	000000.	.013787	50/032	177.250000	1915.301590	100.000000	1.000000
25	008379 - 003931	000000	150000	C02459	186.250000	2013 222870	35,000000	000000
29	002809	000000	002800	.001729		4496.270874	46.000000	1.09060
30	001549	000000	.001549	010103.	-	7505.533203	42.000000	1.033000
31	000826	000000	.000826	. 000569	181.750600	14961.275269	45.000000	1.090033
32	000426	000000.	.000426	600000.	:	24925.656494	38.003000	1.000000
33	000213	000000	. 000213	, C00162		150678.980469	124.000000	1.00000
य :	000103	000000	501000	780003	187.250000	714 165 406250	289.000000	630000
c e	011802	00000	208110.	015898	17: 750000	1681 31.087	13.000000	000000
37	004135	000000	. 004135	. 009249	177.250000	5.114.8.12834	85.000000	C00000.
36	002331	000000	.002331	. 605407	173.75.0000	18713.571533	170.000000	.000000
39	001272	.000000	.001272	.003178	2	36825.845703	163.000000	000000
04	.002879	.003550	.000671	. 001863	_	74953.039063	197.00000	000000
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25	710000	000000	710000	C00093	3.250000	4333028.312500	284.000000	000000°
46	928178	.00000	. 528178	. C42864	160.750000	46	6.000000	000000
47	898615	000000	. 898615	. 652009	162.250000	25.758423	2.000000	. 000000
48	861050	000000	.861050	. 660573	<u>.</u>	26.006276	6.000000	600000
49	178351	083330	.814979	.067685	165.250000	19.314271		000000.
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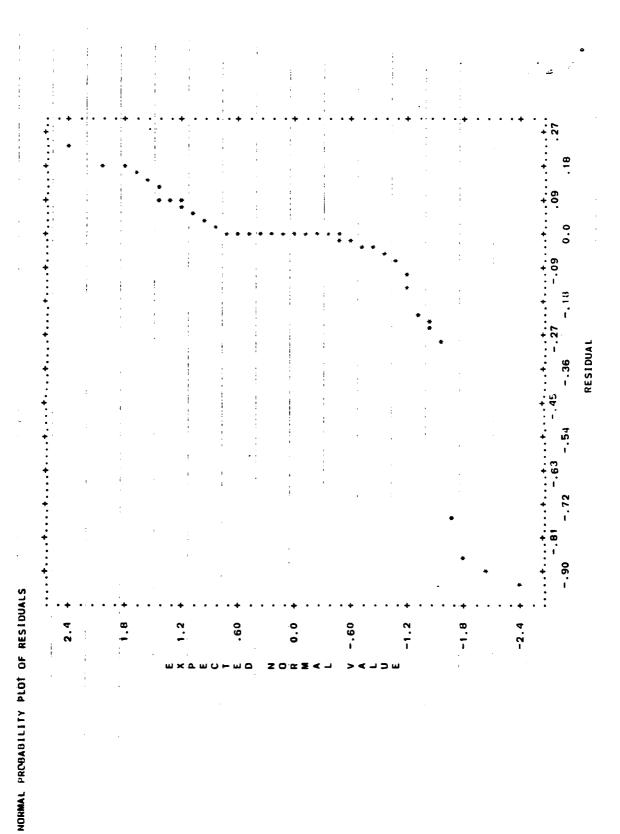
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6 12 164.250000 173.750000 173.750000 173.750000 173.750000 181.250000 181.250000 181.250000 181.250000 181.250000 181.250000 173.750000 173.750000 173.750000 173.750000 173.750000 174.250000 175.750000 176.750000 177.250000	000000
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.698149 .629463 .556372 .4881306 .335716 .2359722 .211424 .119239 .016313 .026593 .016387 .016387 .016387 .00134 .001929 .001934 .000134 .000134 .000134 .000134 .000134 .000134 .000134 .0012493 .001366 .001366 .001366 .001366 .001366 .001366 .001366 .001366 .001366 .001366 .001366 .001366 .001366	08/060.
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.033926	.013787	676800.	166100.	.00280g	.001549	.000826	000450	000103	.011802	001700.	. 004135	.002331	.001272	1/9000	.000343	691000	.0000	. 00003	87.1960	9,1076	030130	0.00100	260405	96.4899	. 629463	. 556372	. 481306	. 406B99	. 335716	. 269992	.211424	161051	67.2510	16.059.0	.040513	.026593	916910.	.058337	.039412	613620.	185910.	9/60900	857500	ace100	.0010.12	. 0005-14	.0002/5	.000134	. 000063	.000029	000013
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$\sigma \alpha$.01378	.00837	.00493	00280	. 0015	28000.	٠	000010	• •	00710	.00413	.00233	001272	.00287	. 00034				710000-					037949	000537	075892	294526	149679	057516	. 186998	. 124876	9793	- (3719	. 0	6847	9451	5833	.039	96110	7/010	#06/00.	00345	00193	00100	.00054	.00027	. 60013	CO	.0000	000013
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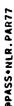
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PROGRAM REVISED OCTUBER 25, 1978 MANUAL DATE -- 1977 UMCPAR--DERIVATIVE-FREE NONLINEAR REGRESSION
HEALTH SCIENCES CUMPUTING FACILITY
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PROGRAM TERMINATED NORMALLY.



PROGRAM REVISED OCTUBER 25, 1978 MARIUAL DATE ... 1977 UNDDAR--CERIVATIVE-FREE NONLINEAR REGRESSION
HEALTH SCIENCES COMPUTING FACILITY
UNIVERSITY OF CALIFORNIA, LOS ANGELES
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PROGRAM CONTROL INFORMATION

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REGRESSION TITLE PARAMETE REGRESSION NUMBER WEIGHTING VARIAB NUMBER OF PARAME FOLERARICE FOR PE TOLERARICE FOR PE TOLERARICE FOR PE TOLERARICE FOR PE TOLERARICE FOR PE MAXIMUM HUMBER OF MAXIMUM ***********************************	KEGRESSION TITLE PARAMETERS FROM REAL DATA SET # 3(5 SOURCES)	REGRESSION NUMBER 2 DEFENDENT VARIABLE HOLD WEIGHTING VARIABLE CASEWI NUMBER OF PAPAMETERS 6 NUMBER OF PAPAMETERS 0 NUMBER OF PAPAMETERS 1.0-003 TOLEHANCE FOR CONVERGENCE 1.0-005 NAXIANAM NUMBER OF INCREMENT HALVINGS 20	1 P(1)	NLRDAT.A3 R OF CASES READ 65	BILE STANDARD STANDARD MINIMUM MAXIMUN	HOLD .012998 3.718233 160.750000 186.2550000 .726670 .012998 .061371 .000000 .726670 .726670 .178645 .380006 .000000 1.0000000 1.000000 1.0000000 1.0000000 1.0000000 1.0000000 1.0000000 1.0000000 1.0000000 1.00000000
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RESIDUAL SUM OF SQUARES

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3 73.408450 -16.681553 105180 -994842 228066 853075 4 73.407396 -16.691541 105284 -99032 229050 853085 73.354529 -16.691541 105238 -99033 210202 865326 8 73.35427 -16.683058 105238 -990683 210202 865453 6 73.356203 -16.683037 105179 -990475 21575 865453 7 73.35612 -16.685299 105234 -990417 21576 867451 7 73.35612 -16.685299 105234 -990417 216741 867016 7 73.35485 -16.685299 105234 -990417 216741 861218 7 73.35485 -16.68729 105234 -990417 216741 861218 7 73.25485 -16.60780 104528 -990476 216775 8670771 4 73.266702 -16.606780 104454 -999478	3.56471	16.6	.105066	1.0110.1	180262	835641	.883707
6 73.407396 -16 670565 105103 995120 -279158 -853095 3 73.354729 -16 691541 105234 9960343 -2200520 -863265 8 73.354729 -16 690714 105234 990683 -210202 -863265 6 73.35362 -16 678937 105179 992150 -215215 -865453 7 73.32623 -16 685299 105234 992150 -215205 -865453 7 73.326485 -16 685299 105234 992450 -216741 -865461 7 73.326485 -16 685299 105258 99756 -190241 -865461 3 73.326670 -16 6854018 10458 995376 -190204 -865461 4 73.26670 -16 60530 10474 995153 -227752 -86430 4 73.26670 -16 60530 104724 995153 -223030 -86450 4 73.26670 -16 62737 104724 995153 -	3.40845	16.6	. 105180	. 994542	228066	85.1217	. 856299
3 73.354529 -16.691541 .105284 .990393 201620 863245 6 73.354527 -16.63714 .105284 .991028 210202 865245 73.35542 -16.678937 .105234 .992150 212715 857450 4 73.35673 -16.678937 .105234 .990750 215205 857916 5 73.326153 -16.68299 .105237 .990417 215205 857916 7 73.326153 -16.68299 .105237 .990417 216741 867071 3 73.26485 -16.68299 .105237 .990417 216741 861218 2 73.26485 -16.68299 .104058 .995376 227752 864293 3 73.26700 -16.63274 .104768 .999576 227752 864293 4 73.26702 -16.62730 .104768 .999576 2230308 875344 2 73.102887 -16.627429 .104928 .9948	3.40739	16.6	. 105103	. 995 120	229158	853095	.85684
8 73.354427 -16.690714 .105238 .991028 210202 862453 6 73.35362 -16.673938 .105238 .990683 21275 867453 4 73.356203 -16.6878937 .105274 .992750 215205 867916 7 73.326153 -16.685299 .105234 .990750 215205 867916 7 73.326153 -16.685299 .105234 .990417 216741 867971 3 73.326163 -16.679078 .104058 .987376 190248 8670771 4 73.246798 -16.60530 .104058 .993576 217167 867396 4 73.246798 -16.60530 .104028 .9941093 217167 866392 4 73.202716 -16.628726 .104928 .984093 22363 865364 2 73.10391 -16.624429 .104923 .984841 220346 873432 3 73.03654 -16.61971 .104	3.35452	16.	.105299	£66.066°	209620	863526	.84622
6 73.353682 -16.6R3858 .105238 .990683 212715 862453 4 73.355623 -16.678937 .105234 .9942150 210653 857450 5 73.326153 -16.679078 .105234 .994717 216741 861218 7 73.326485 -16.679078 .105237 .99747 216741 861218 3 73.326485 -16.679078 .105258 .99747 216741 861218 2 73.326485 -16.679078 .104058 .985376 227752 867429 4 73.26702 -16.63744 .104058 .995376 227752 864293 4 73.26792 -16.62876 .104724 .9951390 223823 223823 4 73.26798 -16.62872 .104928 .9841093 223823 223824 2 73.102887 -16.62429 .104923 .984841 210216 873432 3 73.078654 -16.54188 .10445	3.35442	<u>.</u>	.105284	. 991028	210202	863245	. 84642
4 73.335071 -16.678937 .105179 .992150 215205 857450 5 73.326203 -16.685299 .105237 .990417 216741 857916 7 3.326485 -16.6879078 .105258 .990417 191248 867071 3 73.326485 -16.637078 .104058 .99576 227752 85361 2 73.301680 -16.632374 .104058 .991390 217752 864293 3 73.266702 -16.605780 .104724 .991390 217167 864293 4 73.266702 -16.60530 .104724 .991039 217167 864293 4 73.246798 -16.628726 .104928 .991093 223034 854579 3 73.202716 -16.627429 .104928 .9944841 220348 8651079 3 73.02897 -16.595568 .104913 .9844841 220346 865113 3 73.049380 -16.591868 .104457 .990036 187392 873432 4 73.03127	3.35368	<u>છ</u>	. 105238	. 990683	212215	862453	. 84777
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7 73.326153 -16.685299 .105237 .990417 216741 861218 3 73.325485 -16.679078 .105258 .987498 191248 870771 2 73.256260 -16.632374 .104758 .999576 227752 864293 3 73.266702 -16.605330 .104724 .9939576 223823 863392 4 73.246799 -16.605330 .104724 .995153 223823 854579 4 73.246799 -16.628726 .104928 .984093 223823 854539 3 73.22716 -16.624429 .104923 .984841 210246 875344 2 73.102891 -16.5918270 .104813 .984841 210246 805813 73.049380 -16.541888 .104457 .984341 222346 873432 4 73.031277 -16.511971 .104853 1873432 873350	3.32620	فِ	. 105234	. 993750	215205	852916	.84916
3 73.325485 -16.679178 -1987998 -1981248 -1970771 2 73.305486 -16.632374 104058 995376 -227752 -864293 3 73.266702 -16.60530 104724 995376 -227362 -860392 4 73.266702 -16.60530 104724 995153 -223823 -8650429 4 73.22679 -16.628726 104928 981093 -223823 -86554 2 73.102891 -16.624429 104923 984841 -220368 -187344 3 73.102897 -16.624429 104813 984841 -220368 -187343 3 73.02864 -16.495568 104813 984859 -2243113 -6668713 4 73.03432 -16.541888 104457 990036 -1873432 8 73.030472 -16.611971 104873 990026 -1873350 -873350	3.32615	ည် ရ	105237	. 990417	216741	861218	. 847510
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4 73.266702 -16.606780 .104768 .991330 217167 86.0392 4 73.246793 -16.605330 .104928 .995153 223123 854.79 3 73.202716 -16.628726 .104928 .981093 200348 873044 2 73.102897 -16.598270 .104813 .984841 210348 802803 3 73.078654 -16.495568 .104813 .984569 243113 868713 3 73.049380 -16.541888 .104457 .9943971 222246 873432 6 4 73.031277 -16.611971 .104862 .990036 1873432 6 8 73.030472 -16.614071 .104873 .990254 184538 873350	3.27626	9.9	104316	. 989576	209081	864293	. 84055
4 73.246798 -16.605330 .104724 .995153 223423 854579 3 73.202716 -16.628726 .104928 .983415 230348 965564 2 73.102897 -16.591820 .104813 .9844841 210216 182803 3 73.078654 -16.495568 .104133 .984569 243113 868713 3 73.049380 -16.541888 .104457 .9943971 222246 873432 4 73.031277 -16.611971 .104862 .990036 1873432 873432 8 73.030472 -16.614071 .104873 .990254 184538 873350	3.26670	<u>.</u>	.104768	. 991390	217167	860392	.84684
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2 73.103991 -16.624429 .104923 .983415 230308 875344 3 73.102887 -16.598270 .104813 .984841 216216 805803 2 77.078654 -16.456 .104437 .9843971 224313 807313 3 73.049380 -16.541888 .104457 .990036 187302 873432 4 73.031277 -16.611971 .104873 .990254 184538 184536	3.20271	<u>.</u>	.104928	. 981093	71-000	866564	.83765
3 73.102887 -16.598270 .104813 .984841 210216 982803 2 73.078654 -16.495568 .104133 .984569 243113 868713 . 3 73.049380 -16.541888 .104457 .9843971 222246 077895 . 4 73.031277 -16.611971 .104862 .990036 1873432 . 8 73.030472 -16.614071 .104873 .990254 184538 873350	3.10399	16.6	.104923	. 983415	230368	875344	.821205
2 73.078654 -16.495568 .104133 .984569243113868713	3.10288	16.5	.104813	, 984841	210216	082803	.81390
3 73.049380 -16.541888 .104457 .983971222246077895 4 73.031277 -16.611971 .104852 .990036187342873432 8 73.030472 -16.614071 .104873 .990254184538873350	3.07865	16.4	. 104133	. 984569	243113	868713	.81950
4 73.031277 -16.611971 .104852 .990036187342873432 °. 873350	3.04938	16.5	.104457	1 263971	222246	077895	. 81504
8 73.030472 -16.614071 .104873 .990254184538873350	3.03127	16.6	.104862	. 990036	187982	873432	. 81048
	3.03047	16.6	.104873	. 990254	184538	873360	. 81083

. THE CONVERGENCE CRITERION HAS NOT BEEN SATISFIED.

PARAMETERS FROM REAL DATA SET # 3(5 SOURCES)

:	1	:
VALUES		
ER	•	
PARAMET	P(6)	•
ON I MOTTO	9.10	•
THE FC	P(5) 3600-001	
ST WIT	-8.732	
SMALLE	180-001	
) WAS	4 F -1.8453	
73.0305) WAS SMALLEST WITH THE FOLLOWING PARAMETER VALUES	3 P(3) 9.902541-001	ON MATRIX
4		.A.I
SQUARES	2 P(2) 048728-001	TIC CORRE
	•	0
SUM OF	-	SYMPT
THE RESIDUAL SUM OF SQUARES (=	1 P(1) 2 P(2) 3 P(3) 4 P(4) 5 P(5) 6 P(6) -1.661407+001 1.048720-001 9.902541-001 -1.845380-001 -8.753600-001 8.108331-001	ESTIMATE OF ASYMPTOTIC CORRELATION MATRIX

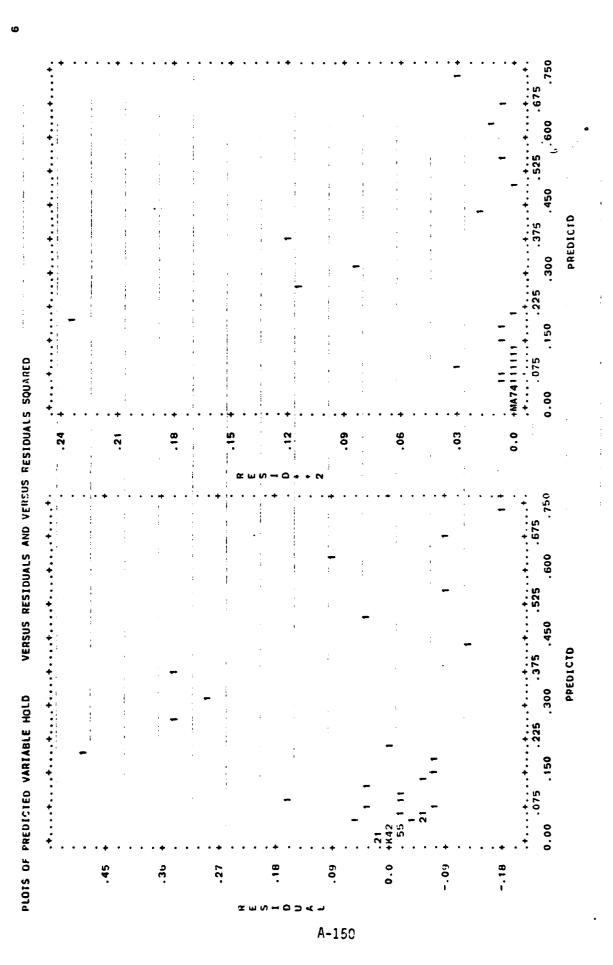
					₹ \$	
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:		: :			GREES OF	6 P(6) 521113-001
f		:	0000.		30 65	2.
		:			HITH	P(5) 247-00
		1.0000	. 4565	;	TIMATES	1.701
			. 1814	•	PARAMETER ES	5.737299-001 1.701247-001 2.521113-001
	1.0000	.4190	.3055	1.238	IATIONS OF	3 P(3) 2.902650-001
0000	.0829	. 1173	. 1467	RUR 1S	DARD DEV	
0000	1187	1768	1724	SQUARE ERI	TOTIC STAN	2 P(2)
<u>-</u> i	ii	i	i	D MEAN	ASYMPI	_
1) 1	4)	5) 5	9 (9	IE ESTIMATE	STIMATES OF	1 P(1) 2.005340+000
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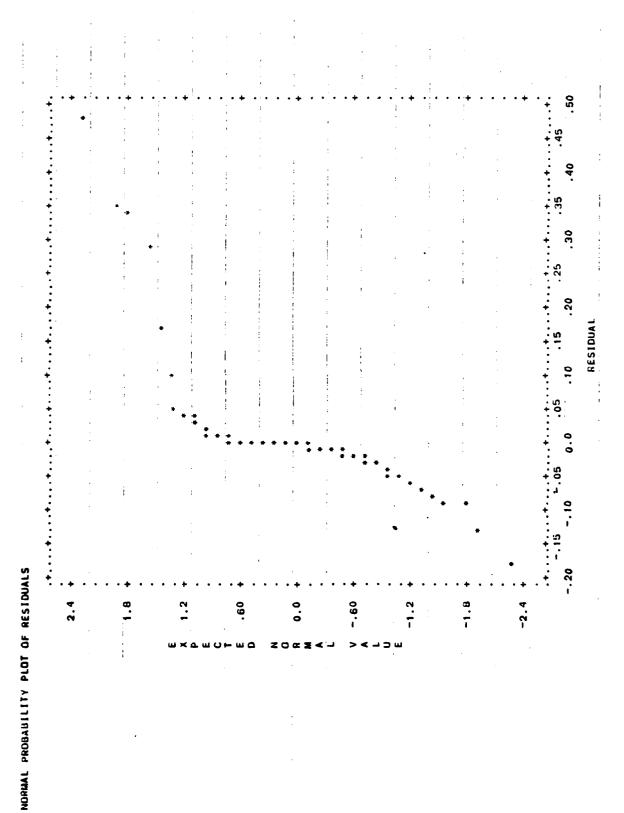
11 9	000000	000000	000000.	20000	000000	000000	000000	000000	.000000	000000	000000.	000000	1.000000	1.000000	1.000000	1.000000	1.000000	0000000	1.000000	1.000000	1.00000	1.000000	1.000000	1.000000	1.000000	000000.	C00000.	000000	000000	000000	000000	000000.	60000	600000	cococo.	00000	000000	000000	000000	202000	000000	00000	00000	000000	600000	00000	000000	00000	000000.	-
4 TIMENT	18.000000	131.000000	•	112.000000				126.000000		•	82.000000	36.000000			•	201.000000	140.000000	136.000000	56.000000	119.000000	288.000000	90.00000	000000 O6	20.00000	5.000000	55.000000	9000000	٠	311.000000	•	•	42.000000	•	000000.11	•	149.000000	104.00000	0000000	44.00000	0000000	000000	000000.69	٠	000000	155.00000	59.00000	293.000000	000000.751	53.000000	
3 CASEWI	37.294627	263.047478	81.155460	357.733348	273.170616	593, 225517	1931.289459	2604.084167	1109.013474	2210.104340	4697.717163	5767.313660	441.568779	1690.119156	2609.981293	5307.752563	5724.410767	8746.239258	6056.132263	20364.827681	81423.337891	45310.479980	80033.190430	83501.959961	33131.026955	174.576843	327.038086	920.70.1826	2226.781281	5961.130554	1113.095200	991.261200		666 706504	166 606106	196.690196	124.509114	40 (67069	49.107002	13.240134	70 000.00	1000000	176.302375	28.4 19407	235.039882	110.799619	634.417480	3/6.316833	198.344755	
1 PERF	164.750000	168.250000	167.750000	177 750000	17.1.250000	175.750000	177.250000	178.750000	180.250000	181.750000	183.250000	180.250000	160.750000	168.250000	16.1.750000	- 1	172.750000	174.250000	175.750000	177.250000	178.750000	180.250000	181.750000	18.3 . 250000	184.750000		17.1.250000	175.750000	177. 250000	178.75.0000	180.250000	181.750000	0000000	184.750000	160.75.0000	000000000000000000000000000000000000000	16.7.750000	16: 250:00	0000000	160.750000	160.23.0000	000000000000000000000000000000000000000	00000001/1	172.750000	171.250000	175.750000	17 250000	178.750000	180.250000	
STO. DEV. PREDICTED	.040279	.632819	.026363	406020	.013050	.010252	.000022	.006231	.004785	.003618	.002685	. (01385	.017439	. 012694	. 009064	.006355	.004378	.002966	.001976	.001296	. 00836	.000230	.000331	.000203	.00122	.044391	.028805	80//10	.011325	931500.	866800.	06/8030	#Z0809.	276900.	000000	Egicho.	. 64 3883	2001.0	5/0/63:	207700	996669	000000	05033	508810.	018000		76913.	600000	.016630	:
PREDICTED 2 HOLD	.191203	.151322	117399	91.7690.	.048455	034584	.024155	.0165013	.011032	.007211	.004609	.001759	.031180	.021638	.014690	.009755	.006334	.004021	.002496	.001514	868000.	.000520	.000294	.000163	86000.	.093723	250042	.051257	612960.	.025743	.017538	.011848	**///00.	.004988	236362	105051.	.681471	562422	00000	008884	101101	000000	.318449	264501	215741	172593	. 135388	. 104090	.078403	:
OBSERVED 2 HOLD	.676050	.079360	.160150	007220	07770	035640	.013860	000000	000000	000000	000000.	000000.	.033560	.014050	.022240	000000	.017750	000000	000000	000000	000000	000000	000000	000000	000000	.260570	.114840	000000	.018020	000000	000000	000000	000000	000000	00000	065066.	091/25.	00000	060004.	000150	020005	0/202/	000000	. 602480	.208-160	102600	.089530	.077860	000000	
RESIDUAL	. 484847	071962	.042751	986070.	048885	.001056	010295	016506	011032	007211	004609	001759	.002380	007588	.007550	009755	.011416	004021	002496	001514	868000 -	000520	000294	000163	0000UB	. 166847	96/140.	051257	018699	-,025743	017658	0118:18	00774	004988	671600-	7/68/1-	094311	951000	000000	##:C190.	750031	181000	185062.	919/56.	007281	069993	045858	026230	078403	•
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176.783247 34. 93.318983 9. 275.376457 44. 577.792397 69. 2748.856506 241. 22860.196411 113. 6464.451782 163. 4984.094727 81. 18579.388181 194. 18579.388181 194. 35900.456055 208. 54254.814941 65.	61 6 6 14 6 14 6 14 6 14 6 14 6 14 6 14
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	PREDICTED 2 HOLD 1191203 117349 0069244 0072112 0016506 001729 001518 001518 001518 001518 001518 001518 001518 001518 001518 001518 001518 001518 001518 001518 001518
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.095148	.718580	.623432	.041080	000000.	1.000000	00000
093566	468890	.562456	. 037073	000000	1.000000	000000
.031544	.531500	.499956	.032331	000000.	1.000000	.00000
128637	.308920	.437457	.027486	000000	1.000000	00000.
.350187	.726670	.376433	. 023268	000000	1.000000)00000°
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91916.	.602480	. 264511	666810.	000000.	1.000000	00000
007281	. 208460	. 215741	.018606	000000	1.000000	00000
£66690°-	.102609	.172593	.018683	000000	1.000000	00000
045858	.089530	. 135388	.018537	000000	1.000000	00000.
026230	.077860	. 104090	694110.	000000	1.000000	000000
078403	000000	.07940.3	.016630	000000.	1.000000	.00000
057836	000000	.057836	. 014923	000000.	1.000000	00000
041769	000000	.041769	. 012919	000000	1.000000	00000.
046061	000000.	.046061	. 621802	000000.	000000.	1.00000
017276	.015490	.032766	. C16290	000000.	000000.	1.00000
011328	.011480	.022808	. 011935	. 000000	. 000000	1.00000
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.014480	.021220	.006740	.004182	000000	000000	1.00000
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.000077	.002750	.002673	.001890	000000	000000	1.000000
001626	000000.	.001626	. 601235	000000	000000	1.00000
000967	000000.	.000967	.000792	000000.	000000.	1.00000
000562	000000	.000562	.000498	000000.	000000.	1.00000
000319	000000	. 000319	. 000307	000000	000000	1.00000
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HEALTH SCIENCES COMPUTING FACILITY
UNIVERSITY OF SALIFORNIA, LOS ANGELES
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PROGRAM REVISED OCTUBER 25, 1978
MARUAL DATE -- 1977

PROGRAM TERMINATED NORMALLY.

BBRKPT PRINTS

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APPENDIX B

BMDP 1981 VERSION NONLINEAR REGRESSION OUTPUTS

74.5	- 1	
COMPANY METADRY/LENGTH, LEXICA, 18(2) DIMENSIAN DE (NDAR), Y (NVAR)	,KASE,NVAR,NPAR,IP,XLOSS,10)	:
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DF(1) = DEXP(P(2)+X(3)) DF(2) = P(1)+X(3)+DF(1) DF(3) = DEXP(P(4)+X(3))		
DF(4) = P(3) × (3) · DF(3) F = P(1) · DF(1) + P(3) · OF(3)		1 .
EMAP, 1E REIDERI INIVAT SEGMENTED MAP OF BMDD3R		; ; ;
BASED ON IBM OVERLAY STRUCTURE ALLOCATION ADDED	WITH DYNAMIC MEMORY	1 : : : : : : : : : : : : : : : : : : :
LIB BMDP-SOURCE+BMDP3R. LIB BMDP-SOURCE+BMOPLIBB1. NOT TPF\$.		
SEG \$4AIN\$ IN MAIN/PROGRAM		
SSTARI SSTARI FZFRI		•
ZE, SETUPS, GETCOR, PRTHI	ED, PJRNWS, TIMEV, ENDSUB	;
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SEG 28.,2A		

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SHOULD FOLLOW THE DIRECTIVE IN MEMORY !!!!!
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SEG 1F*, 1E
IN PLOTR, PLTSIN, PLTMFL, PLTSFL, PLTPRT, SCALE, PLTNPR
                                                                                                                 SFREPO
SERCOR, SFFOUT
                                                                                                                                                                                                                                                                                                 IF PROGRAM IS
                                                                                                                                                                                                                                                                                                                                                   TITLE IS 'RADIOACTIVE SULFATE DATA'.
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                                        XREADS, TRANS, TRANSF, MISVAL
                                                                                                                                                                                                                                                                                                  . ADD THE FOLLOWING AS +LAST+ SEGMENT
BE SEGMENTED
                                                     FORMRC, INTCHS
                                                                                           TPFS. PARFUN, TRANT
    INITER
                 FUNC3R
                                                                   FREERC
                                                                                                                                             CLEARB, RECORD
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                             CREDEV, REDEV
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IN DUMPA
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1N
SEG 2H•,2G
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SEG 21+,2H
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                                                                                                                                                                                                                                                        SEG 1K+, 1J
                                                                                                                                                                                                                                                                     SEG 11. +, 1K
                                                                                                                                                                                                                                                                                 SEG 134, 11
                                                                                                                                        SEG 16+, 10
                                                              SEG 3N. 3M
                                                                         SEG 20+,2C
                                                                                      SEG 10+,1C
                                                                                                               SEG 2F+, 2E
                                                                                                                                                                                                                                                                                                                 SEG MEM.()
                       SEG 10.,18
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196 .047267	047767			NAMES ARE COUNT, CASEMT, TIME.	•	FORMAT 15 '(FB.4, FB.6) '.		DEFENDENT 15 COUNT. NUDBER 15 1. WUJBER 15 1. WEIGHT 15 CASEWT. WEIGHT 15 CASEWT. WEIGHT 15 CASEWT. NUJARY 2 2 001379 4 010487 6 012093 8 013900 10 012093 8 012093 8 0125249 30 022249 30 022249 30 022249 30 022249 30 024177 40 026393 60 024177 40 026393 60 024177 40 026393 60 034402 90 034402 90
1:58 .049453 1602 .052600	0.4046.2	.04/20/	DEPENDENT 1S CO INDEPENDENT 1S CO NULBER 1S 1. R NULBER 1S 1. R NULBER 1S 1. R NULBER 1S 0. 2 NULBER 1S 0. 2 004379 4 010487 4 010487 6 010591 15 010591 15 010591 25 027249 30 010591 15 027833 60 037402 80 038540 110	DEPENDENT 1S CO INDEPENDENT 1S NUCHBER 1S 1, PARAMETERS ARE WEIGHT IS CASEW INITIAL ARE 10, 001379 2 007749 6 010387 6 010387 6 010387 7 010914 15 020387 80 020387 80 020387 80 020387 80 03039 80 03039 70 03039 70 03039 70	NAMES ARE COUNT, CASEWINDER SAFE COUNT, INDEPENDENT IS COUNT, PARAMETERS ARE 4. WEIGHT IS CASEWT. WEIGHT IS CASEWT. RINITIAL ARE 10,1, 11 ROUGHST B B COUTABY B COU	NAMES ARE COUNT.CA DEFENDENT IS COUNT INDEPENDENT IS TIM NUMBER IS 1. PARAMETERS ARE 4. WEIGHT IS CASEWT. O04379 2 O07749 4 O10487 6 O12093 8 O10914 15 O16914 15 O16914 15 O125249 30 O22249 30 O22249 30 O227833 60 O24402 90 O34402 90		.04/26/ .049453 .052600
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1915 .034402 1938 .038540 1 1717 .042135 / 1	.034402 .038540 .042135 / 1	.034402 .038540 1	DEPENDENT 1S CO INDEPENDENT 1S NUMBER 1S 1. PARAMETERS ARE WEIGHT IS CASEW INITIAL ARE 10, 007749 2 007749 4 010487 6 012093 10 016914 15 018591 20 022067 25 022249 30 022349 30	DEPENDENT 1S CO INDEPENDENT 1S NUCHBER 1S 1, PARAMETERS ARE WEIGHT IS CASEW INITIAL ARE 10, 004379 2 007749 4 010487 6 012093 8 013900 10 015914 15 0125249 30 022249 30 022249 30 0224177 40 0224177 40	NAMES ARE COUNT, CASEWINDEFENDENT IS COUNT. INDEFENDENT IS TIME. NUCHBER IS 1. PARAMETERS ARE 4. WEIGHT IS CASEWIT. RINITIAL ARE 10,1, 19 004379 2 007749 4 010487 6 012093 8 013900 10 012093 10 012093 8 013900 00 012093 8 013900 00 012093 8 013900 00 012093 8 013900 00 012093 8 013900 00 020067 25 022249 30 020067 25 022249 30 0227833 60	NAWES ARE COUNT.CA DEFENDENT IS COUNT INDEPENDENT IS TIM NUMBER IS 1. PARAMETERS ARE 4. WEIGHT IS CASEWT. R INITIAL ARE 10, 001379 2 007749 4 0102093 8 013900 10 016914 15 018591 20 022667 25 022749 33 022177 40 0227833 60		
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#MAP.IE MAP 30R1 S74T11 09/16/82 07:57:21 MAIN ELEMENT START ADDRESS NOT USED - ALTERNATIVE FOUND START=007061, PROG SIZE(1/D)=10776/8744 SYS\$*RLIB\$. LEVEL 74R1A END MAP. ERRORS: 0 TIME: 39,659 STORAGE: 25649/9/044777/0111777

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                                                                                                      COPYRIGHT (C) 1981 REGENTS OF UNIVERSITY OF CALIFORNIA 09/16/82
                                                                                                                                                          TO SEE REMARKS AND A SUMMARY OF NEW FEATURES FOR THIS PROGRAM, STATE NEWS. IN THE PRINT PARAGRAPH.
DEPARTMENT OF BIOMATHEMATICS
UNIVERSITY OF CALIFORNIA, LOS ANGELES, CA 90024
                                                                                                                                                                                                                                                                TITLE IS 'RADIOACTIVE SULFATE DATA'.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            REWIND INPUT UNIT PRIOR TO READING. . DATA. NUMBER OF WORDS OF DYNAMIC STORAGE. . . . . NUMBER OF CASES DESCRIBED BY INPUT FORMAT .
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    BLANKS ARE. . . . . . . . . . . . . . . .
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                                                                     PROGRAM REVISED JUNE 1981
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            PROBLEM TITLE IS
RADIOACTIVE SULFATE DATA
                                                                                       MANUAL REVISED -- 1981
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Charles and Charles were

MAXIMUM LENGTH DATA RECORD IS

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TIME	COUNT	CASEWT	4	0	.000000000000	.0000100000	20	ro.	-	Q.	USING THE ABOVE SPECIFICATIONS THIS PROGRAM COULD PROCESS 1463 CASES.	1 RECORDS READ PER CASE.
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JASED ON INPUT FORMAT SUPPLIED 1 RECORDS READ PER CASE.	•	STANDARD DEVIATION	1.711865 .014208 60.915967
ORMAT SUPPLIED	NUMBER OF CASES READ	MEAN	5.750701 .035707 97 .933350
BASED ON INPUT F	NUMBER OF CASES	VARIABLE ON NO. NAME	O 1 COUNT 2 CASENT 3 TIME

PARAMETER	PARAMETER MAXIMA		2126765+038	.2126765+038	.2126765+038	.2126765+038
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7	0	.582450-001	B.301627	130408	6.940312	003081
e	•	189502-001	9.234015	178251	7.336724	003128
4	•	. 134532-001	10.542872	211035	7.343437	1
ß	0	.128966-001	11.124462	223769	7.364383	003160
9	•	.128496-001	11.290756	227774	7.374456	003170
7	•	.128457-001	11.336529	228964	7.377790	003174
6	0	.128453-001	11.349532	229309	7.378793	003175
6	•	.128453-001	11.353258	229409	7.379086	003175
9	0	.128453-001	11.354326	229438	7.379170	
=	•	.128453-001	11.354633	229446	7.379195	003176
12	•	.128453-001	11.354721	229448	7.379201	003176
13	•	.128453-001	11.35474"	229449	7.379203	003176

13 HAS THE SMALLEST RESIDUAL SUM OF SYNARES(SUBJECT TO CONSTRAINTS, IF ANY). TEBATION

T.

PAGE 3 RADIOACTIVE SULFATE DATA
ASYMPTOTIC CORRELATION MATRIX OF THE PARAMETERS

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ā	P2 2 - 8140 P3 3 .1459 P4 4 - 1139	RESIDUAL MEAN SQUARE	DEGREES OF FREEDOM	PARAMETER ESTIMATE	P1 11.354747 P2229449 P3 7.379203 P4003176

PAGE 4 RADIOACTIVE SULFATE DATA

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14.508458 1 14.508458 2 11.821134 3 10.106008 4 9.005399 5 7.399400 7 0.00540	f 8458 1134	PRED VALUE	COUNT	RESIDUAL	CASEWI	TIME
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	0510	.070454	7.334200	. 293690	.018591	20.000000
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	0285	.071352	6.704100	016185	.022249	30.000000
	0131	.065070	6.431300	068831	.024177	40.000000
11 6.295938	5938	.057665	6.155400	140538	.026393	50.000000
	9043	.051118	5.994000	105044	.027833	60.00000
	8395	.045842	5.769800	138595	.030039	70.00000
	3715	.042003	5.644000	079715	.031392	80.00000
	5.544809	.039683	5.391500	153309	.034402	90.00000
	3598	.039321	5.093800	109798	.038540	110.000000
	3384	.043086	4.871700	011684	.042135	130.000000
	4.582875	.048814	4.599600	.016725	.047267	150.000000
•	.439627	.051932	4.496800	.057172	.049453	160.00000
	1.300858	.055065	4.360200	.059342	.052600	170.000000
•	6426	.058141	4.266800	.100374	.054928	180.000000

CPU TIME USED 3.820 SECONDS

SERIAL CORRELATION

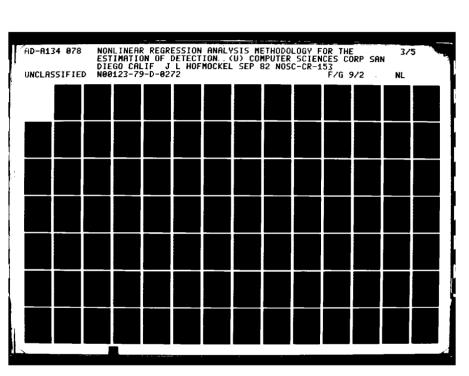
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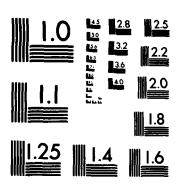
GE 5 BMDP3R - NONLINEAR REGRESSION 09/16/82 AT 07:58:00

NO MORE CONTROL LANGUAGE.

PROGRAM TERMINATED

PBRKPT PRINTS





MICROCOPY RESOLUTION TEST CHART
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SUBROUTINE PARFUN(F,DF,P,X,N,KASE,NVAR,NPAR,IP,XLOSS,ID)

SUBROUTINE PRECISION (A-H,O-2)

COMMON/MEMORY/LENGTH,LEXICN,IB(2)

DIMENSION DF(NPAR),P(NPAR)

DF(3) = 1.0

A = P(1) * X(1) + P(2)

IF(A-LE.O.O) A = 0.000001

F = 1.0/A + P(3)

DF(2) = -1.0/A * * 2.

DF(1) = X(1)*DF(2)

RETURN

END FTN 66 18AM 28 DBANK 4 COMMON

. NEITHER . MISSING 14998 PROGRAM REVISED JUNE 1981
MANUAL REVISED -- 1981
COPYRIGHT (C) 1981 REGENTS OF UNIVERSITY OF CALIFORNIA
A1 07:59:35 TO SEE REMARKS AND A SUMMARY OF NEW FEATURES FOR THIS PROGRAM, STATE NEWS. IN THE PRINT PARAGRAPH. BMDP3R - NONLINEAR REGRESSION DEPARTMENT OF BIOMATHEMATICS UNIVERSITY OF CALIFORNIA, LOS ANGELES, CA 90024 (213) 825-5940 12 CHARACTERS INITIAL ARE 0.01, 0.1, 5. NAMES ARE STANDARD, COUNT. VARIABLES ARE 2. FORMAT 1S '(F6.0,F6.3)'. TITLE IS 'INSULIN DATA'. INDEPENDENT IS STANDARD. DEPENDENT IS COUNT. NUMBER IS 2. MAXIMUM LENGTH DATA RECORD 15 PROGRAM CONTROL INFORMATION PARAMETERS ARE 3. COUNT VARIABLES TO BE USED 1 STANDARD 2 PROBLEM TITLE 15 INSULIN DATA INPUT FORMAT IS (F6.0, F6.3) BLANKS ARE. /PARAMETER /VARIABLE /REGRESS /PROBLEM /INPUT /END B-21

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PAGE

Y. .

FIELD TYPE V A R I A B L E S · · VARIABLE 7 P C 1

VARIABLE

RECORD

COLUMNS

FIELD TYPE

REGRESSION TITLE INSULIN DATA

~	STANDARD	COUNT		6	•	.00000001	.0000100000	20	្ឌ	-	Q.
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Z	_	5	5	Ž	3	ē	ē	9	9	M	SS
REGRESSION NUMBER	Z	DEPENDENT VARIABLE	G	NUMBER OF PARAMETERS		TOLERANCE FOR PIVOTING	TOLERANCE FOR CONVERGENCE	₹	MAXIMUM NUMBER OF INCREMENT HALVINGS	WINBER OF DATA PASSES PER CASE	COMPUTE LOSS FUNCTION
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Æ	Z	岁	뿔	Ž	₹	2	2	Š	Š	₹	8
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USING THE ABOVE SPECIFICATIONS THIS PROGRAM COULD PROCESS 1633 CASES.

		MAXINUM	200.000000 9.522000
PER CASE.	7	MINIMUM	.000000
1 RECORDS READ PER CASE.	•	STANDARD DEVIATION	69.637996 2.773082
AT SUPPLIED		MEAN	55.714285 5.661286
BASED ON INPUT FORMAT SUPPLIED	CO NUMBER OF CASES READ	S VARIABLE NO. NAME	1 STANDARD 2 COUNT

PARAMETER MINIMA	PARAMETER	MAXIMA	ARAMETER MAXIMA	.2126765+038	.2126765+038	.2126765+038
INCREMENT RESIDUAL SUM HALVINGS OF SQUARES P1 P2 0 .168068+003 .010000 .100000 0 .707096+001 .002958 .120812 0 .249154+000 .002694 .108981 0 .249145+000 .002694 .108981 0 .249145+000 .002694 .108981 0 .249145+000 .002694 .108981 0 .249145+000 .002694 .108981	PARAMETER	MINIMA	•	2126765+038	2126765+038	2126765+038
.010000 .100000 .002958 .120812 .002694 .108966 .002694 .108981 .002694 .108981 .002694 .108981 .002694 .108981	I TERA TION NUMBER	INCREMENT HALVINGS	RESIDUAL SUM OF SQUARES		P 2	P3
.002958 .120812 .002667 .107692 .002694 .108981 .002694 .108981 .002694 .108981 .002694 .108981	•	•	.168068+003	.010000	.100000	5.000000
.002694 .108966 .002694 .108981 .002694 .108981 .002694 .108981 .002694 .108981 .002694 .108981	-	0	.707096+001	.002958	.120812	1.312471
.002694 .108966 .002694 .108981 .002694 .108981 .002694 .108981 .002694 .108981	~	0	.319398+000	.002667	.107692	137569
.002694 .108981 .002694 .108981 .002694 .108981 .002694 .108981 .002694 .108981	e	•	.249154+000	.002694	.108966	138173
.002694 .108981 .002694 .108981 .002694 .108981 .002694 .108981	4	•	.249145+000	.002694	108981	.138055
. 002694 . 108981	'n	•	.249145+000	.002694	108981	138049
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. 002694 . 108981	œ	•	. 249145+000	.002694	108981	.138049
	on .	•	.249145+000	.002694	108981	138049

ITERATION 9 HAS THE SMALLEST RESIDUAL SUM OF SQUARES(SUBJECT TO CONSTRAINTS, IF ANY). REMAINING CALCULATIONS ARE BASED ON THE RESULTS OF THIS ITERATION,

PAGE 3 INSULIN DATA
ASYMPTOTIC CORRELATION MATRIX OF THE PARAMETERS

				TOLERANCE	.0942264249 .1667718963 .0465878277
P3 3	. 0000 . 8830 1 . 0000	.226495-001	=	ASYMPTOTIC Standard Deviation	.000220 .002070 .186350
P1 1	1.0000 .7446 .9357	SQUARE	EEDOM	ESTIMATE STAND	. 002694 . 108981 . 136049
	322 - 325 - 3	RESIDUAL MEAN SQUARE	DE' 'S OF FREEDOM	A AMETER	4.2

PAGE 4 INSULIN DATA

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STANDARD	5. 000000 10. 000000 10. 000000 25. 000000 25. 000000 50. 000000 100. 000000	200.000000
RESIDUAL	039981 222731 222731 .049269 199495 .052467 .052467 .153882 153882 132118	115973
OBSERVED COUNT	9.274000 9.522000 8.082000 7.296000 7.296000 7.864000 8.974000 8.996000 9.974000 9.998000	1.566000
STD DEV OF PRED VALUE	. 088011 . 088011 . 056879 . 056879 . 056879 . 064245 . 066495 . 066495 . 061842 . 061842 . 059201 . 059201	.091104
PREDICTED	9.313981 9.313981 8.304731 7.495495 7.495495 5.809533 6.809533 4.242117 4.242117 2.781170 1.681973	1.681973
CASE NO. LABEL	- a u 4 n a v a a o - s a u	7

3.392 SECONDS

CPU TIME USED

SERIAL CORRELATION

PAGE 5

BMDP3R - NONLINEAR REGRESSION 09/16/82 AT 07:59:39

NO MORE CONTROL LANGUAGE.

PROGRAM TERMINATED

PBRKPT PRINTS

#0LD*FIN.FIN.SI P3R SUBROUTINE P3 IMPLICIT DOUG CORMON/MEMDRY, DIRENSION DF(1 DF(1)*1.000-D1 F=P(1)+(0.4900) RETURN	NOTE TO SEE THE SEE TH			
IMPLIC COMMON. DIMENS: DF(1)=- DF(2)=- F=P(1) RETURN	ITINE PREFUNCTION F.DF.P.X.N.KASE.NVAR.NPER. 1P. ALOSS	1P. ALOSS. 1D.)		
DE (1) = 0 DF (1) = 0 F = P(1) = 0 F = P(1) = 0	LE PRECISION (A			
DF(1) = DF(2) = - F = P(1) = PF(1) = PF(1) = PF(1) = PF = PF = PF = PF = PF = PF = PF = P				:
F = P(1)	. UDU-DEAF(-F(Z)*(A(3)-B. UDU) -(0.49D0-P(1))*(X(3)-B. UDO)*DEAP(-P(2)*(X(3)-B. ODO)	*(X(3)-8.0D0))		
	+(0.49D0-P(1))+DEXP(-P(2)+(X(3)-8.0D0))			1
END END				
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. BASED ON IBM OVER . ALLOCATION ADDED	BM OVERLAY STRUCTURE WITH DYNAMIC MEMORY I ADDED	₽.		
CMG+320103-00tis 91				
	RCE+BMDPL1881.			;
NOT TPFS.				
₹.	•			
IN MAIN/P	MAIN/PROGRAM	-		
_				
IN F2FRI				
•	,SETUPS,GETCOR,PRTHED,P3RNWS,TIMEV	, ENDSIJB		
	GETHNG, GETINP, GETME, GETSTR, GETNAM, RUTRAN			:
2A*	PLINFO			
SEG 34.	797			;
IN SEG 38+,3A	0.2174			
36.	PLINFI, SFOPEN, SFTOFC, SFTINO			
586 30 *, 38 IN	SFIRPT			•
SEG 30.,3C			1	:
IN SFG 3E+.3D	PLINF2			
,	PLINF3			
SEG 3F*, 3E	P. L. L. C. C. C. C. C. C. C. C. C. C. C. C. C.			
SEG 3G+,3F				
16 SFG 3H+ .3G	FORCMP, NEXTFM			
3	FORSIM			
SEG 31 +, 3H	FORANA			
SEG 30*,31	•	!		
284.	VARPRI, BLDFMT		ı	
	UNCOLA			
5EG 3K*	INITER			
SEG 31 + , 3K				:
113 563 10+ 18	FUNCSR			

	IN XRE	XREADS, TRANSF, WISVAL	į
SEG 3N*.3M FREERC SEG 20*.2C 14 SEG 10*.1C SEG 10*.1C 15 SEG 10*.1C SEG 10*.1C SEG 20*.2E SEG 21*.2E RITEND, PRIRID, SFTDOT, SFTOUT, SFTEND, SF N SERCOR, SFFOUT SFREPO N SEG 10*.1D SEG 10*.1C N SEG 20*.2E RITEND, PRIRID, SFTDOT, SFTOUT, SFTEND, SF N SEG 10*.1D N SEG 10*.1C N SEG 10*.1C N SEG 10*.1C N SEG 10*.1C N SEG 10*.1C N SEG 10*.1C N SEG 10*.1C N SEG 10*.1C N SEG 10*.1C N SEG 10*.1C N SEG 10*.1C N SEG 10*.1C N SEG 10*.1C N SEG 10*.1C SEG 1		FORING, INTCHS	:
SEG 2D*, 2C IN SEG 10*, 1C SEG 10*, 1C IN SEG 2F*, 2E IN IEND, PRINID, SFTDOT, SFTEND, SF IN SERCOR, SFFOUT SERCOR, SFFOUT SERCOR, SFFOUT SERCOR, SFFOUT SEG 1F*, 1E IN SEG 2F*, 2E IN SEG 1F*, 1E SEG 1F*, 1E SE		FREERC	:
SEG 100.1C IN SEG 2E* LSTSQ.RITEIT, PARPSI. DORDER, PARSIP IN SFREDO IN SFREDO IN SFREDO IN SFREDO IN SFREDO IN SFREDO IN SFREDO IN SFREDO IN SFREDO IN SFREDO IN SFREDO IN SFREDO IN SFREDO IN SFREDO IN SFREDO IN SFREDO IN SFREDO IN SFREDO IN ROTERI SEG 210.1D IN ROTERI SEG 210.2H IN ROTERI SEG 210.2H IN SHADOW SEG 110.1H I	2D+,2C		
SEG 2E* SEG 2F*.2E ILSTSQ,RITEIT, PARPSI, DORDER, PARSIP SEG 2F*.2E IN SFREDO NO SERCOR, SFFOUT SERCOR, SFFOUT SERCOR, SFFOUT SEG 1E*, 1D NO CLEARB, RECORD SEG 1F*, 1E NO RDIERR SEG 2G* NO RDIERR SEG 2G* NO RDIERR SEG 11*, 14 NO RDIERR SEG 11*, 14 NO RDIERR SEG 11*, 14 NO RDIERR SEG 11*, 14 NO RDIERR SEG 11*, 14 NO RDIERR SEG 11*, 14 NO RDIERR SEG 11*, 14 NO RDIERR SEG 11*, 14 NO RDIERR SEG 11*, 14 NO RDIERR SEG 11*, 14 NO RETYPE SEG 11*, 14 NO	10.10		:
SEG 2F*.2E IN SEG 2F*.2E IN SERCOR, SFTDOT, SFTDOT, SFTEND, SF IN SERCOR, SFFOUT SERCORO SEG 1F*, 1E IN CLEARB, RECORD SEG 1G*, 1) IN RDTER1 SEG 2G* IN RDTER1 SEG 1G*, 10 IN RDTER1 SEG 1G*, 10 IN RDTER1 SEG 1G*, 10 IN RDTER1 SEG 1G*, 10 IN RDTER1 SEG 1G*, 10 IN RDTER1 SEG 1G*, 10 IN RDTER1 SEG 1G*, 10 IN RDTER2 SEG 1G*, 10 IN RDTER3 SEG 1G*, 10 IN RETYPE SEG 1G*, 10 IN RETYPE SEG 1G*, 10 IN RETYPE SEG 1G*, 10 IN RETYPE SEG 1G*, 10 IN RETYPE SEG 1G*, 10 IN RETYPE SEG 1G*, 10 IN RETYPE SEG 1G*, 10 IN RETYPE SEG 1G*, 10 IN RETYPE SEG 1G*, 10 IN RETYPE SEG 1G*, 10 SEG 1G*, 10 IN RETYPE SEG 1G*			
SEG 2F*, 2E RITEND, PRTRID, SFTDOT, SFTOUT, SFTEND, SF RITEND, PRTRID, SFTDOT, SFTEND, SFTEND, SF SEG 1E*, 10 N CLEARB, RECORD SEG 1F*, 1E N ROTERR SEG 2G* ROTERR SEG 21*, 2H N SEG 21*, 2H N SEG 11*, 1G SEG 11*, 1G N SEG 11*, 1G N SEG 11*, 1G N SEG 11*, 1G N SEG 11*, 1G N SEG 11*, 1G N SEG 11*, 1G N SEG 11*, 1G N SEG 11*, 1G N SEG 11*, 1G N SEG 11*, 1G N SEG 11*, 1G N SEG 11*, 1G N SEG 11*, 1G N SEG 11*, 1G N SEG 11*, 1G N SEG 11*, 1G SEG 11*, 1G N SEG 11*, 1G SEG 11*, 1G N SEG 11*, 1G SEG 11*, 1G N SEG 11*, 1G SEG 11*, 1G N SEG 11*, 1G	2E•	SO, RITEIT, PARPSI, DORDER, PARSIP	
IN STEED PATRID. SFTDOT, SFTEND, SFTEN	2F + , 2E		
SERCOR, SFFOUT SERCOR, SFFOUT SEG 1E*, 1D OLEARB, RECORD SEG 1F*, 1E IN PLOTR, PLISIN, PLIMFL, PLISFL, PLIPRI, SCALE, P IN ROTERN SEG 2G* IN ROTERN SEG 21*, 2H IN GETERR SEG 11*, 1H IN GETERR SEG 11*, 11 IN GETARG SEG 11*, 11 IN RETYPE SEG 11*, 14 IN RETYPE SEG 11*, 14 IN RETYPE SEG 11*, 14 IN RETYPE SEG 11*, 14 IN RETYPE SEG 11*, 14 IN RETYPE SEG 11*, 14 IN RETYPE SEG 11*, 14 IN GETARG SEG 11*, 14 IN GETARG SEG 11*, 14 IN GETARG SEG 11*, 14 IN MEMDEN SEG 11*, 11 IN MEMDEN SEG 11*, 11 IN MEMDEN SEG 11*, 11 IN MEMDEN SEG 11*, 11 IN MEMDEN SEG 11*, 11 IN MEMORY SEG 11*, 11 SEG 11*			
1E*, 1D CLEARB, RECORD 1F*, 1E PLOTR, PLTSIN, PLTMFL, PLTSFL, PLTPRT, SCALE, P 1G*, () RDTER1 2G* RDTER1 2H*, 2G RDTER2 21*, 2H RDTER2 1H*, 1G GETERR 11*, 1H DUMPA 1J*, 11 SHADOW 1K*, 1J RETYPE 11*, 1H GETARG 1G*, 1L RAHDUM, RANDG SCANENTED HEIM*, () HEIM*	2 2		!
CLEARB, RECORD 1F*, 1E 1G*, () RD1ERR 2G* RD1ERR 2H*, 2G RD1ER1 2H*, 2G RD1ER2 21*, 2H RD1ER2 1H*, 1G GETERR 1J*, 11 SHADOW IK*, 1L RANDUM, RANDG SCANENTED HEIM*, ()	1E+.		
1f*,1E PLOTR,PLTSIN,PLTMFL,PLTSFL,PLTPRT,SCALE,P 1G*,10 RDTERR 2G* RDTER1 2H*,2G RDTER2 21*,2H RDTER2 1H*,1G GETERR 1J*,11 SHADOW 1K*,1J GETARG 1U*,1L RANDUM,RANDG	· !	RECORD	
1G* () 2G* RDTER1 2H*, 2G RDTER2 21*, 2H RDTER2 1H*, 1G GETERR 11*, 11 SHADDW 1K*, 1J KETYPE 11*, 1L RANDUM, RANDG SLGMENTED INE! 1. RANDUM, RANDG INE! 1. RANDUM, RANDG INE! 1. RANDUM, RANDG INE! 1. RANDUM, RANDG INE! 1. RANDUM, RANDG INE! 1. RANDUM, RANDG INE! 1. RANDUM, RANDG INE! 1. RANDUM, RANDG INE! 1. RANDUM, RANDG INE! 1. RANDUM, RANDG INE! 1. RANDUM, RANDG INE! 1. RANDUM, IN PROGRAM IN WEMORY	16.	_	
2G* RDTER1 2H*, 2G RDTER2 21*, 2H RDTER2 1H*, 1G GETERR 110*, 11 SHADDW 1K*, 1J WETYPE 110*, 1L RANDUM, RANDG 1G*, 1L RANDUM, RANDG 1G*, 1L RANDUM, RANDG 1G*, 1L RANDUM, RANDG 1G*, 1L RANDUM, RANDG 1G*, 1L RANDUM, RANDG 1G*, 1L RANDUM, RANDG 1G*, 1L RANDUM, RANDG 1G*, 1L RANDUM, RANDG 1G*, 1L RANDUM, RANDG 1G*, 1L RANDUM, RANDG 1G*, 1L RANDUM, 1F PROGRAM 1D*, 10 10*, 10 1	9	•	:
2G* RDTER1 2H*, 2G RDTER2 21*, 2H RDTER2 IH*, 1G GETERR III*, IH DUMPA IJ*, II SHADOW IK*, IJ RETYPE II*, IK GETARG III*, IL RANDUM, RANDG SEGMENT IF PROGRAM SEGMENTED IN WENDEN IN WENDEN IN WENDEN IN WENDEN IN WENDEN IN WENDEN IN WENDEN IN WENDEN IN WENDEN IN WENDEN	•		
RDTER1 21*,24 RDTER2 21*,24 RDTER3 11*,14 DUMPA 110*,11 SHADDW 11*,14 GETARG 110*,11 RANDUM,RANDG STGMENT IF PROGRAM STGMENTED IN WEIMORY 101HING* SHOULD FOLLOW THE DIRECTIVE IN MEMORY	2G•		
21*,24 RDTER2 21*,24 RDTER3 11*,14 DUMPA 110*,11 SHADOW 11*,14 GETARG 110*,11 RANDUM,RANDG SIGMENTED INE FOLLOWING AS *LAST* SEGMENT IF PROGRAM IN WEIMORY IN WEIMORY IN WEIMORY IN WEIMORY IN WEIMORY	100		
21*,2H POTENTIAL TO THE TO THE TO THE DIRECTIVE IN MEMORY 11*,11 SHADOW 14*,11 SHADOW 16*,14 GETARG 111*,14 GETARG 111*,14 GETARG 111*,14 ARHDUM,RANDG SEGMENT IF PROGRAM SEGMENTED IN WEIMORY FOULDWING AS *LAST* SEGMENT IF PROGRAM SHOULD FOLLOW THE DIRECTIVE IN MEMORY	71.17		
H+, 1G GETERR GETERR 11-, 1H DUMPA 1J-, 1J SHADOW 1K+, 1J RETYPE '	21 + , 2H	The same designation of the same of the sa	i
GETERR GETERR 111H DUMPA 111 SHADOW 1K1J RETYPE ' IE1K GETARG IM1L RANDUM, RANDG D THE FOLLOWING AS *LAST* SEGMENT IF PROGRAM SCGMENTED MEM.() N MEMORY OTHER SHOULD FOLLOW THE DIRECTIVE IN MEMORY	21.441		
111H DUMPA 1J11 SHADOW 1K1J RETYPE 111K GETARG 1M1L RANDUM, RANDG D. THE FOLLOWING AS *LAST* SEGMENT IF PROGRAM SEGMENTED 1M.MEMORY 1M. HAMEMORY 1	•		
DUMPA 1J*11 SHADOW 1K*1J RETYPE ' GETARG 1G*1L RANDOM,RANDG D THE FOLLOWING AS *LAST* SEGMENT IF PROGRAM SEGMENTED NAEMORY DIMING* SHOULD FOLLOW THE DIRECTIVE IN MEMORY	=		
11.11 11.11 11.14 11.14 GETARG 114.14 RANDUM, RANDG D THE FOLLOWING AS *LAST* SEGMENT IF PROGRAM SEGMENTED 114.16 114.17			
1K*, 1J RETYPE 11*, 1K GETARG 1M*, 1L RANDUM, RANDG D THE FOLLOWING AS * LAST* SEGMENT IF PROGRAM SCANENTED NAEMORY NAEMORY OTHER SHOULD FOLLOW THE DIRECTIVE IN MEMORY	• •	And the second s	:
RETYPE ' GETARG IM+.1K RANDUM,RANDG D THE FOLLOWING AS +LAST+ SEGMENT IF PROGRAM SEGMENTED NAEMORY NAEMORY OTHTING* SHOULD FOLLOW THE DIRECTIVE IN MEMORY	X		
111K GETARG IM1L RANDUM,RANDG D THE FOLLOWING AS .LAST. SEGMENT IF PROGRAM SEGMENTED NAENORY NAENORY OTHER SHOULD FOLLOW THE DIRECTIVE IN MEMORY			:
GETARG IM*.1L RANDUM,RANDG D. THE FOLLOWING AS *LAST* SEGMENT IF PROGRAM SEGMENTED WHEN,() N MEMORY OTHING* SHOULD FOLLOW THE DIRECTIVE IN MEMORY	<u>:</u>		
IM*.1L RANDUM,RANDG D. THE FOLLOWING AS *LAST* SEGMENT IF PROGRAM SCGNENTED NAEMORY NAEMORY OTHER SHOULD FOLLOW THE DIRECTIVE IN MEMORY			
THE FOLLOWING AS *LAST* SEGMENT IF PROGRAM SEGMENTED HIGH. () NAME MAINORY OTHER SHOULD FOLLOW THE DIRECTIVE IN MEMORY			
D THE FOLLOWING AS *LAST* SEGMENT IF PROGRAM SCANENTED AND THE DIRECTIVE IN MEMORY OTHER SHOULD FOLLOW THE DIRECTIVE IN MEMORY		DONAR	
پ خو خو	. ADD THE FOLLC	G AS +LAST + SEGMENT IF PROGRAM	,
ب عد د	SE SEGMENTED		
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PROBLE	/INPUT	41047	/REGRES	_	•	/PADA:4F		/END 0.490	0.490	0.490	0.480	0.470	0.460	0.450	0.450	0.430	0.440	0.430	0.460	0.450	0.420	0.430	0.410	0.400	0.420	0.400	0.410	0.400	0.410	0.400	0.400	0.380	0.410	0.400	0.410	0.380	0.400	0.390	0.330 FDF
. , 0	60	- a r	114	116 117 118	119	121		a iv	126	127	129	130	132	133	135	136	138	139	141	142	144	145	45	148	6 6	151	152	153	155	156	157 158	. 651	091	161	163	164	166	167	169 169

END FIN 91 IBANK 33 DBANK 4 COMMON

OMAP, 1E
MAP 30R1 S74T11 09/16/82 08:00:38
MAIN
SIART 007061, PROG SIZE(1/D)=10776/8744
SYSS*RIBS, LEVEL 74R1A
END MAP. ERRORS: 0 TIME: 39.776 STORAGE: 25649/9/04477/0111777

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TITLE IS 'AN EXAMPLE NONLINEAR REGRESSION - H. SMITH'. TITLE IS'X CHLORINE/UNIT OF PRODUCT RES ON TIME ELAPSED'. NE I THE R MISSING 14998 COPYRIGHT (C) 1981 REGENTS OF UNIVERSITY OF CALIFORNIA 09/16/82 AT 08:01:27 . TO END TO SEE REMARKS AND A SUMMARY OF NEW FEATURES FOR THIS PROGRAM, STATE NEWS. IN THE PRINT PARAGRAPH. BMDP3R - MUNITALING STEER STEE NUMBER OF VARIABLES TO READ IN.

NUMBER OF VARIABLES ADDED BY TRANSFORMATIONS.

TOTAL NUMBER OF VARIABLES.

NUMBER OF CASES TO READ IN.

CASE LABELING VARIABLES.

MISSING VALUES CHECKED BEFORE OR AFTER TRANS.

BLANKS ARE... AN EXAMPLE NONLINEAR REGRESSION - H. SMITH VARIABLES ARE 3. FORMAT IS '(F5.3,F5.1,F5.1)'. NAMES ARE CHLOR, CASEMT, TIME. INITIAL ARE 0.30.0.02 INDEPENDENT IS TIME. DEPENDENT IS CHLOR. PARAMETERS ARE 2. PROGRAM CONTROL INFORMATION WEIGHT IS CASENT. HALVING 15 20 MANUAL REVISED -- 1981 PROBLEM TITLE 15 /PARAMETER /VARIABLE /REGRESS /PROBLEM /INPUT /END

MAXIMUM LENGTH DATA RECORD 15

G-33

2 CASENT VARIABLES TO BE USED # CHLOR

INPUT FORMAT IS

(F5.3,F5.1,F5.1)

15 CHARACTERS.

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5	IABLE	RECORD	202	EZS	FIELD	TYPE	VARIABLE	SOLCE	SVS	-
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FIELD	NO. BEGIN END WIDTH	1	
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RECORD	2	1	-
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REGRESSION TITLE X CHLORINE/UNIT OF PRODUCT RES ON TIME ELAPSED

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Z	INDEPENDENT VARIABLE (FOR BUILT-IN FUNCTION)	DEPENDENT VARIABLE	WEIGHTING VARIABLE	_	NUMBER OF CONSTRAINTS	_ _	TOLERANCE FOR CONVERGENCE	MAXIMUM NUMBER OF ITERATIONS	MAXIMUM NUMBER OF INCREMENT HALVINGS	NUMBER OF DATA PASSES PER CASE	COMPUTE LOSS FUNCTION
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USING THE ABOVE SPECIFICATIONS THIS PROGRAM COULD PROCESS 1470 CASES.

	BAS	Ē	8	Ž	ב ב	BASED ON INPUT FORMAT SUPPLIED	=	2	颪	Ξ	٥		-	RE	CORD	S	EAD	PER	1 RECORDS READ PER CASE.				
	\$	10EA	0.5	ర	SES	NUMBER OF CASES READ	÷	•		•	•	•	•			:	•		4				
B-35		VARÍABLE NO. NAME	ABL	w w				1	MEAN				SO	EV	STANDARD DEVIATION	2 Z		3	MINIMUM	5		MAXIMUM	3
		_	5	CHLOR				•	.425000	Š	•			•	.030309	60		•	.380000	00		. 490000	000
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	۵.	ARA	MET	E	NIN	IMA.	•	•		•	•	•	•		•	i	2126	765+	038	ï	21267	PARAMETER MINIMA	

P2	.020000	.022521	.024988	.029796	.038986	.055743	.107597	.100513	.101609	.101632	.101633	.101633	.101633	.101633
14	.300000	.316927	.329635	.349264	.373851	. 395049	.407726	. 390266	.390135	. 390140	. 390140	. 390140	. 390140	. 390140
RESIDUAL SUM OF SQUARES	.263152-001	.259215-001	.253047-001	.247638-001	.244790-001	.222562-001	.106857-001	.500810-002	.500168-002	.500168-002	.500168-002	.500168-002	.500168-002	.500168-002
INCREMENT HALVINGS	•	s	S	4	က	7	•	•	•	•	•	0	-	8
I TERA TION NUMBER	0	-	~	m	4	S	©	7	æ	Œ	2	=	12	13

13 HAS THE SMALLEST RESIDUAL SUM OF SQUARES (SUBJECT TO CONSTRAINTS, IF ANY). I TERATION

PAGE 3 % CHLORINE/UNIT OF PRODUCT RES ON TIME ELAPSED ASYMPTOTIC CORRELATION MATRIX OF THE PARAMETERS

18.00 Sept.

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			TOLERANCE	.2117044715
1.0000	.119088-003	42	ASYMPTOTIC Standard Deviation	. 013360
1.0000 1.0000 1.0000	SQUARE	EDOM	ESTIMATE	.390140
2 - 2 -	RESIDUAL MEAN SQUARE	DEGREES OF FREEDOM	PARAMETER	-7

% CHLORINE/UNIT OF PRODUCT RES ON TIME ELAPSED

STORY BUREAUGUS CONTRACTOR

residents) ususpialan kaladida kiyesidiring ya dala

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CASEWT	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.00000	1.00000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.00000	1.000000	000000.	1.00000	1.000000	1.00000	1.000000	1.000000	1.000000	1.000000	1 . 000000	
RESIDUAL	.000000	000000	.008368	001632		001632	.003358	.003358	006642	026642	. 005590	014410	014410	.005572	004428	004428	.033718	.023718	.000368	.000366	.010366	004209	004209	014209	.010218	009782	009782	.003831	006169	.003831	. 006780	003220	000814	000B14	020814	.011149	.00149	.002751	. 014059	015941	.005126	.005126	004003	- 003283	
OBSERVED CHLOR	.490090	.490000	.480000	.470000	480000	.470000	.460000	.460000	.450000	.430000	.450000	.430000	.430000	.440000	.430000	.430000	.460000	.450000	.420000	.420000	436000	.410000	.410000	.400000	.420000	.400000	.400000	.410000	.400000	.410000	.410000	.400000	.400000	.40000	000086.	.410000	40000	.400000	.410000	380000	400000	.400000	.390000	00006E.	
STD DEV OF PRED VALUE	.000000	000000	.001419	.001419	.001419	.001419	.002199	.002199	. 002199	.002199	.002537	.002537	.002537	.002587	.002587	.002587	.002465	.002465	.002269	.002269	.002269	.002078	.002078	.002078	. 001959	.001959	.001959	.001951	.001951	.001951	.002056	.002056	.002246	. 002246	.002246	.002483	.002483	.002740	.002996	.002996	.003241	.003241	.003468	.003674	
PREDICTED CHLOR	. 490000	. 490000	.471632	. 471632	.471632	.471632	.456642	. 456642	, 456642	.456642	.444410	.444410	.444410	.434428	.434428	.434428	. 426282	. 426282	.419634	.419634	.419634	.414209	.414209	.414209	. 409782	.409782	.409782	.406169	. 406169	. 406169	. 403220	. 403220	400814	400814	400814	. 398851	CARE.	. 397249	. 395941	. 395941	.394874	. 394874	. 394003	. 393293	•
ABEL						•																																							
CASE NO. LABEL	-	~	m	₹	in	Φ	1	•	o	9	=	2	13	=	2	9	17	6	.	20	21	25	-3 -3		22	5 0	27	58	29	00	3	35	ee e	T	9.0	90	10	88	5 ·	9	- 4	42	F)	;	

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4.678 SECONDS

CPU TIME USED

AGE 5

UMDP3R - NONLINEAR REGRESSION 09/16/82 AT 08:01:35

NO MORE CONTROL LANGUAGE.

PROGRAM TERMINATED

BRKPT PRINTS

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		WEIGHT IS CASEMT.
011 008 008 008 008 008 008 008 008 008		
008 /PARAMETER 008 /PARAMETER 008 008 008 008 008 008 008 008 007 008 008 008 008 008 009 009 009 009 001 009 009 001 009 009 001 009 009 009 009 009 009 009 009 009 009	-	ARF 10
008 /P ARAMETER 009 /P LGT 009 /P LGT 009 /E ND 009 /E ND 009 /E ND 009 /E ND 009 /P ROBLEM 011 /V ARIABLE 012 /V ARIABLE 013 /V ARIABLE 014 /V ARIABLE 015 /V ARIABLE 016 /V ARIABLE 017 /V ARIABLE 018 /V ARIABLE 019		
008 / PARAMETER 008 PADT 008	- 6	TALVING 13
008 /PLOT 008 008 008 008 /END 011 @ADD, P NLR 008 @TEST TNE/ 008 @TEST TNE/ 008 @TEST TNE/ 008 @TEST TNE/ 008 @TEST TNE/ 008 @TEST TNE/ 008 @TEST TNE/ 008 @TEST TNE/ 009 /PROBLEM 011 @ADD, P NLR 009 /PLOT	900	
008 /PLUI 008 6 END 008 6 END 011 6 ADD, P NLR 008 6 END 008 6 END 008 6 END 008 6 END 008 6 END 008 6 END 009 6 PASS+NLR 011 011 011 011 011 011 011 011 011 011		INITIAL ARE -20.0.0
008 008 008 008 008 FEND 018 FEDD, P NLR 008 FEST TNE/ 008 FEND 008 FEND 008 FEND 008 FEND 009 FEND 009 FEND 001 FEND	B00	
008 008 008 008 008 008 008 008 008 008		RESIDUAL.
008 008 008 008 008 001 001 008 008 008		VARIABLE IS PERF.
008 008 008 008 008 008 008 008 008 008		NORMAL.
008 / END 018 / END 019 / END 019 / END 019 / END 008 / END 008 / END 008 / END 009 / PROBLEM 011 / ARIABLE 012 / ARIABLE 013 / ARIABLE 014 / ARIABLE 015 / ARIABLE 015 / ARIABLE 016 / ARIABLE 017 / ARIABLE 018 /	800	DNORMAL
008 /END 011 @ADD, P NLR 008 @TEST TNE/ 008 @END 009 @PASS+NLR. 009 @PASS+NLR. 009 @PASS+NLR. 009 /PROBLEM 011 011 011 011 011 009 009 009 009 009	800	SI2E IS 50,40;
008 @ ED P NLR 008 @ ED F 008 @ ED T NE F 008 @ ERS 21, 009 @ ERS 21, 009 @ ERS 21, 009 @ PROBLEM 011	008	
008 & EDF 008 & JUMP 3 008 & DATA, L 21 008 & END 009 & ERS 21. 009 & PASS+NIR. 009 PROBLEM 011 OOB 008 INPUT 011 OOB 008 OOB 009 OOB	110	P NLRDAT
008 @TEST TNE/ 008 @LUMP 3 008 @END 1. L 21 008 @ENS 21. 009 @PASS+NLR. 009 /PABLEM 011 011 0011 0011 0011 0011 0011 0011	800	•
008 @JUMP 3 008 @EAA, L 21 009 @FASS+NLR. 009 FROBLEM 011 011 011 011 011 011 011 011 011 01	800	
008 @DATA, L 27 008 @END 008 @PASS+NLR. 009 PROBLEM 011 011 011 011 011 011 011 011 011 01	008	OND 3
008 GEND 009 GERS 21, 009 GPASS+NLR, 009 /PROBLEM 011 011 011 009 /VARIÁBLE 011 REGRESS 011 PARAMETER 009 /PLOT 009	000	A;A, L 21.
009 PERS 21. 009 PASS+NIR. 011 008 /INPUT 011 011 008 /INPUT 011 008 009 011 009 PLOT 009 /PARAMETER 011 640 PLOT 009 PL	008	2
009 6PASS+NLR. 009 / PROBLEM 0011 0011 0011 0011 0011 0011 0011 00	008	SS 21.
008 / PROBLEM 011 011 011 011 011 010 008 008 008 008	600	ASS-NIR. Base
011 011 011 011 011 011 011 011 008 008	800	
008 /INPUT 011 011 008 /VARIÁBLE 011 008 008 009 011 001 009 009 009 009 009 009 009	011	1111F 15 1
011 011 011 008 011 008 011 008 011 011	800	
011 008 /VARIÁBLE 011 008 008 008 011 011 011 008 /PLOT 008 008 008 008 008 008 008 008 008 00	-	VADIABLES
008 /VARIABLE 011 008 008 008 008 011 011 011 001 008 008		1 FR 2 FG
011 008 008 008 008 001 011 011 001 001	600	
008 /REGRESS 011 008 008 009 011 011 011 008 008 009 009 009 009 009 009 009 009	10	NAMES ARE PERF. HOLD
008 008 009 001 0011 0011 0011 009 009 009 009	800	
008 011 011 011 011 011 011 011 008 008	011	1
008 008 009 009 009 009 009 011 011 011 011 011		INDEPENDENT IS PERF.
008 011 012 013 008 008 014 015 011 011 011 011 011 018 008 008 008 008		DEPENDENT 15 HOLD.
011 PARAMETERS ARE 6. 008 (1) ITERATIONS ARE 10. 011 HALVING IS 50. 008 /PARAMETER INITIAL ARE =20.0,0 008 /PLOT RESIDUAL. 008 PLOT RESIDUAL.	:	
008 011 1TERATIONS ARE 10. 011 011 012 008		PARAMETERS ARE 6.
011 HALVING IS 50. 001 PARAMETER 011 NITIAL ARE =20.0,0 008 /PLOT RESIDUAL. 008 NORMAL. 008 NORMAL. 008 SIZE IS 50,40. 010 #EDF 008 #EST TNE/0/T3 008 #DATA, L 21. 008 #BRKPT PRINT\$		WEIGHT IS CASEWT.
008 /PARAMETER 011 008 /PLOT		ARE 10
008 / PARAMETER 011		HALVING 15
008 /PLOT RESIDUAL. 008	800	
008 /PLOT 008 VARIABLE IS 008 VARIABLE IS 008 NORMAL. 008 NORMAL. 009 SIZE IS 50,4 009 FED NURDAT.A3 009 FEST INE/O/T3 009 FEST INE/O/T3 009 FEST INE/O/T3 009 FEST INE/O/T3 009 FEND 009 FEND 009 FEND 009 FEND 009 FEND 009 FEND 009 FEND 009 FEND	= 0	INITIAL ARE -20.0,0
008 VARIABLE IS 008 NORMAL. 008 NORMAL. 008 E12E IS 50,4 000 / E1D 011 #ADD,P NLRDAT. A3 008 @TEST TNE/O/T3 008 @DATA,L Z1. 008 @END 008 @END 008 @END 008 @END 008 @END 008 @END 008 @END	800	
008 VARIABLE IS 008 NORMAL. 008 DNORMAL. 009 END 011 #ADD,P NURDAT.A3 008 #EDT INE/O/T3 008 #DATA,L 21. 008 #END 008 #END 008 #END 008 #END 008 #END 008 #END 008 #END	;	
008 NORMAL. 008 SIZE IS 008 /EID SIZE IS 008 /EID NURDAT.A3 008 @TEST TNE/O/T3 008 @DATA,L 21. 008 @ERKPT PRINTS 008 @ERKPT PRINTS		2
008 SIZE IS 008 / EID 011 / AADD, P NLRDAT. A3 008 @ FEST TNE/0/T3 008 @ DATA, L 21. 008 @ BRKPT PRINTS 011 @ SYM, U PRI, PR		NORMAL.
008 / END 0011 #ADD, P NLRDAT. A3 0018 #EDF 008 #EST TNE/0/T3 008 #DATA, L 21. 008 #END 008 #END 0011 #SYM, U PRINTS		AAL.
000 /END 011 #ADO,P NLRDAT.A 008 #TEST TNE/0/T3 008 #0.UMP 3 008 #0.DATA,L 21. 008 #END 008 #END 008 #END 001 #END		IS
011 #ADD,P NLRDAT.A 008 @TEST TNE/0/T3 008 @LUMP 3 008 @LUMP 3 008 @END 008 @END 008 @ERKPT PRINT\$ 001 @SYM,U PRT.,PR	600	
008 6FDF 008 6-10MP 3 008 6-10MP 3 008 6EATA, L 21. 008 6END 008 6END 001 65YM, U PRI., PR	011	DO.P NIRDAT. A3
008 @ TEST T 008 @ LUMP 3 008 @ DATA, L 008 @ END 008 @ BRKPT 004 @ END	800	10
008 6.1UMP 3 008 9END 008 9END 008 9BRKPT 011 65YM,U	000	TNE/0/T
008 @END 008 @END 008 @BRKPT 011 @SYM,U	000	
008 @END 008 @BRKPT 011 @SYM,U	800	ب.
008 ABRKPT 011 ASYM, U	800	•
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3	INDEPENDENT VARIABLE (FOR BUILT-IN FUNCTION)	Ξ	===	3	喜	I DLERANCE FOR PLVDTING	7	GAXIGUM NUMBER OF ITERATIONS	JAXINIM NUMBER OF INCREMENT HALVINGS	NUMBER OF DATA PASSES PER CASE	COMPUTE LOSS FUNCTION	
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USING THE ABOVE SPECIFICATIONS THIS PROGRAM COULD PROCESS 897 CASES.

EADD, P NLRDAT.A1

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c	ဒ္	.352505+002	1002	-23.103750	.145015	.027791	.048653	796166	.102245
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BASED ON INPUT FORMAT SUPPLIED

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1 RECORDS READ PER CASE.

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ITERATION 4 HAS THE SMALLEST RESIDUAL SUM OF SQUARES(SUBJECT TO CONSTRAINTS, IF ANY).

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PAGE 3 PARAMETERS FROM REAL DATA SET # 1(6 SOURCES)
ASYMPTOTIC CORRELATION MATRIX OF THE PARAMETERS

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P2	~	1.0000	1990	.2097	.0035	.3739	4057	985.	64	ASYMPIOTIC STANDARD DEVIATION					
PI	-	1.0000	0974	2397	0424	4058	.3927	SQUARE	EDOM	ESTÍMATE	-23.103750	.027791	796166	. 102245	538910
		P1 1	F3 3	P4 4	F5 5	r6 6	7	RESIDUAL MEAN SQUARE	DEGREES OF FREEDOM	PARAMETER	P1 P2	6 4	PS	P.6	P.7

4 PARAMETERS FROM REAL DATA SET # 1(6 SOURCES)

PAGE

CASE NO. LABEL	PREDICTED HOLD	STO DEV OF PRED VALUE	OBS.RVED HOLD	RESIDUAL	CASEWI	PERF	TIMEWT	
_	.025732	.009322	:00000°	025732	1576.689163	172.750000	154.000000	000000
~ :	.015189	.005768	.009230	005959	6217.934937	174.250000	368.000000	000000
7	.008594	. 003533	000000	- 000594	11092.098999	175.750000	374.000000	000000
T uf	004039	07170	000000	- 002419	19920 496582	178 750000	95,00000	00000
	.001202	.000734	000000	001202	9461.950449	180.250000	41.000000	000000
	.000572	.000408	000000	000572	49520.041504	181.750000	109.00000	000000
8	.000260	.000216	.000000	000250	42741.062988	183.250000	40.00000	.000000
6	.000113	2 !	000000	000113	106987.363281	184.750000	4,	000000
2;	.000047	650000	000000	000047	199510 130859	186.250000	33.000000	000000.
- :	910000.	2 6	000000	.000019	135183.197200	187.750000	3.00000	00000.
N 62	.024112	.008141	.017020	.007092	2518.738983	172.750000	233.00000	000000.1
71	.014157	.005080	000000	014157	10891,497681	174.250000	604.000000	1.000000
15	.007967	.003156	000000	007967		175.750000	153.000000	1.000000
91	.004295	.001940	000000.	004295		177.250000	105.000000	1.000000
17	.002217	.001167	000000	002217		178.750000	22.000000	1.000000
B (960100.	.000678	000000.	001096		180.250000	143.000000	1.000000
	915000	8/2000	000000	915000.	47883.004883	181.750000	93.000000	000000
2.5	.000234	10000	00000	- 000234	4953''.624219 613205 421875	184 750000	204 000000	000000
22	. 000042	. 000048	000000	000042	436734.957031	186.250000	69.00000	1.000000
23	710000.	.000022	000000	000017	175667.248047	187.750000	5.000000	1.000000
24	.089525	.027879	.000000	089525	40.672113	168.250000	7.000000	000000
25	.059238	88	.023860	030378	421. 998890	169.750000	91.000000	000000.
26	.0376.12	.012525	.020610	011032	88.1.26.1004	171.250000	124.000000	000000
27	.022953	.008203	000000	022953	1662.252701	172.750000	145.000000	000000
28	.013422	916000.	000000.	013422	1707.822601	174.250000	86.00000	000000
29	.007522	805500	000000.	007522	3950 192963	175.750000	4,	000000.
3.0	.004039		000000	. 004039	15405 303342	177.250000	103.00000	000000
	9/0200	5/2/00	000000	9/07/0	16425.008789	178.750000	132.000000	00000
25	20100.	50000	00000	20100.	•	184.250000	144 000000	000000
34	. 000217	.000212	000000	000217	176707.736328	183.250000	149.000000	000000
35	. 00003	.000105	000000	000093		1134.750000	392.000000	000000
36	.000038	.000050	000000.	000038	457010.527344	186.250000	66.00000	000000.
37	.308937	.052717	.976670	. 667733	10.992023	168.250000	2	000000
38	.236876	.038648	.505960	.269084	37.153728	169.750000	22.000000	000000
39	175175	.026682	.56920	. 394085	21.534353	171.250000	000000	000000.
04	.124777	5	.085040	039737		172.750000	208.000000	000000.
41	.085507	500500	036920	009127	1262 . 99(567	174.250000	391.000000	000000
75	.056315	026900.	000000	300010.1	266969.1/11	175.750000	245.000000	000000
n «	919250	#00/00·	000000	010000	1087.027411	000002777	255.000000	000000
2	610150.	000000	000000	- 013513	E001 033365	178.750000	231.00000	000000
	016210.	750000	00000	616210: 410700 -	250.23303	181 750000	67 000000	00000
0.	*10700	. 60000	00000	- 003747	217% 433958	183 250000	43 00000	000000
. 6	910100	.001281	000000	-,001916	10223.018677	184.750000	74.000000	000000
64	BC6000.	.000755	000000	000938	8971.585815	186,250000	29.000000	000000
200	.000439	-	000000	000439	5342.279175	187.750000	2.000000	000000
51	.228224	. 054954	000000	228224		•		000000
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165.250000 166.750000 168.250000 169.750000 171.250000	174.250000 175.750000 177.250000	180.250000 181.750000 183.250000 184.750000	186.250000 187.750000 184.750000 186.250000	189.250000	
20.839239 73.226260 225.507372 889.253212 913.510033 2465.411499	8855.659771 435°.404846 4105.821716 4672.717773	24434.864990 31125.756348 96551.155273 720601.515625		30171.541016	
107967 102379 081165 033452 033452	011684 006480 003442 001751			2.000072 215	0000000 0000000 0000000 0000000 0000000
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. 167967 . 119049 . 081165 . 053177 . 033452	.011684	.000852 .000397 .000177 .000075	.000031 .000012 .000820 .000381	. 000072	
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2) AND VERSUS RESIDUALS. PLOTS OF VARIABLE(1) VERSUS PREDICTED AND OBSERVED VARIABLE(PARAMEIERS FROM REAL DATA SET # 1(6 SOURCES)

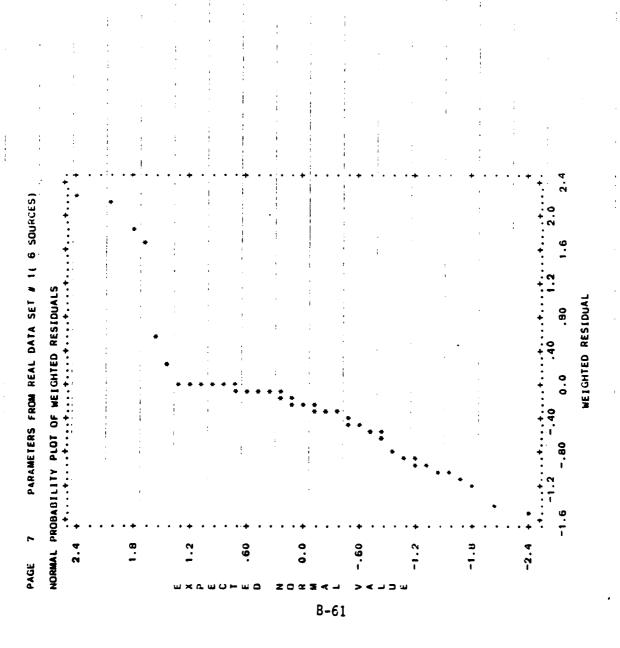
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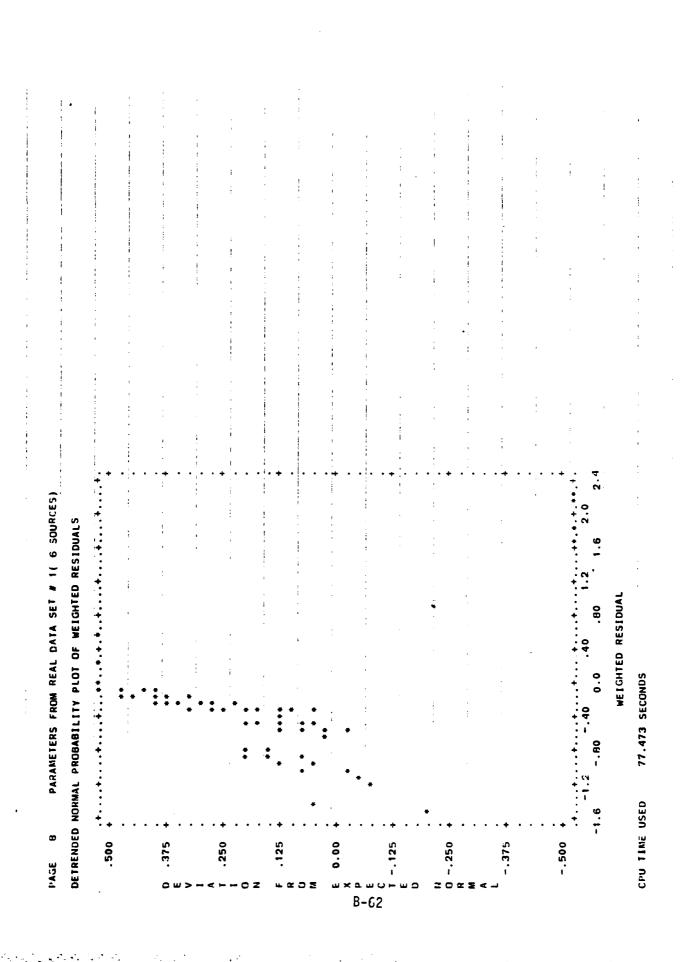
VERSUS RESIDUALS AND VERSUS RESIDUALS SQUARED PARAMETERS FROM REAL DATA SET # 1(6 SOURCES) PLOTS OF PREDICTED VARIABLE HOLD PAGE

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PAGE 9

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UMDP3R - NONLINEAR REGRESSION 09/22/82 AT 16:22:09

NO MORE CONTROL LANGUAGE.

PROGRAM TERMINATED

ELEST 1NE/0/13

POUMP 3 INTERVENING STATEMENTS SKIPPED PERS 21. FURPUR 28R2 S74R1A 09/22/82 16:22:10 END ERS.

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VARIABLES TO BE USED 1 FERF 2 HOLD 3 CASEWT 4 6 12 7 13 8 14	TIMEW! 5 11				
IMPUT FORMAT IS (F6.2,F9.5,F12.5,F6.0,5(1X,F1.0))		:	•		
MAXIMUN LENGTH DATA RECORD IS 41 CHARACTERS.		:	•	!	
INPUT VARIABLE S	VARIAGLE INDEX NAME	RECORD CC NO. BEGI	COLUMNS BEGIN END	FIELD	TYPE
9 1	5 11	-	35	-	· · · · · · · · · · · · · · · · · · ·
2 HOLD 1 7 15 9.5 F	6 12	, (r)	37	_	. ••
1 16 27 1	7 13	-	39	-	ш.
1 28 33	8 14		11 41		
VAKIABLES TO BE PLUTTED 1 PERF			:	;	
PLOT OF PREDICTED VALUES VERSUS RESIDUALS NORMAL PHOBABILITY PLOT	YES YES YES				

2 PARAMETERS FROM REAL DATA SET # 2(5 SOURCES)

PAGE

ILE A REAL DATA SÉT # 2(5 SOURCES)	REGRESSION NUMBER: INDEFENDENT VARIABLE (FOR BUILT-IN FUNCTION) DEPENDENT VARIABLE. WEIGHFING VARIABLE. WEIGHFING VARIABLE. NUMBER OF FARMIETERS. OCCUSTRAINTS. TOLERANCE FOR PLOTING. TOLERANCE FOR CONVERGENCE. TOLOROGOUS FOR CONVERGENCE. TOLERANCE FOR CONVERGENCE. TOLERA	E SPECIFICATIONS THIS PROGRAM COULD PRO	1 RECORDS READ PER	READ	MEAN DEVIATION MINIMUM MAXINUM	188.033289 2.274476 160.750000 169.250000 .993330 .050401 .000000 .993330 .019983 .050401 .000000 .99320 398959.062500 .189.972511 .00.081767 .000000 .99320		MA	MA 2126765+038 2126765+038 2126765+038 2126765+038 2126765+038 2126765+038	REMENT RESIDUAL SUM VINGS OF SQUARES P1 P2 P3 P4 P5 P6	0 .759808+004 -20.00000 .125000 .000000 .000000 .000000 2 .256848+003 3.191531 010508 097136 1.163948 -1.398860 344431 0 .710375+002 -3.206516 .026536 .001244 1.172880 -1.04397 .506430 0 .609974+002 -C.891874 .048106 .073758 1.173642 -1.043521 .683405 13 .609973+002 -C.904113 .048106 .073758 1.173642 -1.044521 .683405 45 .609973+002 -C.904113 .648106 .073758 1.173642 -1.044521 .683405
REGRESSION TITLE PAHAMETERS FRON REAL DATA SET	REGRESSION NUMBER	USING THE ABOVE SPECIFICATIO	BASED ON INPUT FORMAT SUPPLIED	CASES READ		PERF 188.033209 HOLD 019983 CASEWI 215238.474609			MINIMA	INCREMENT HALVINGS	0 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
REGRES PARAME I	REGRESSION INDEPENDEN INDEPENDEN MEIGHTING NUMBER OF TOLERANCE TOLERANCE TOLERANCE MAXIMUM NIMBER OF CUMPUTE LC	3	NO GASED ON	NUMBER OF	NO. NAME		0.00	PARAME	PARAMETER	1 TERATION NUMBER	0-0m740

.683405
-1.044521
1.173642
.073758
.048106
-6.904113
.609973+002 .609973+002
50 43

ITERATION 6 HAS THE SMALLEST RESIDUAL SUM OF SQUARES (SUBJECT TO CONSTRAINTS, IF ANY). REMAINING CALCULATIONS ARE BASED ON THE RESULTS OF THIS ITERATION.

PAGE 3 PARAMETERS FROM REAL DATA SET # 2(5 SOURCES)
ASYMPTOTIC CORRELATION MATRIX OF THE PARAMETERS

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P6	φ:						1.0000	:								
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P4	4				1.0000	.2560	. 1580	:		TOLERANCE	0013238834	.0013129434	4160501974	9150665665	2225826522	6734094942
P3	m			1.0000	.2052	.6413	.4354				,	•	•	•	•	
ğ	84		1.0000	.0863	0823	1738	.0203	.824288	74	ASYMPTOTIC	1.310880	.0074	. 157829	. 4286	. 138632	. 2098
14	-	1.0000		1553	. 0563		0724	OUARE	MOG	ESTIMATE STA	-6.904113	.048106	.073758	1.173642	-1.044521	. 683405
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PARAMETERS FROM REAL DATA SET # 2(5 SOURCES)

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CASE NO. LABEL	PREDICTED HOLD	STD DEV OF PRED VALUE	OBSERVED HOLD	· · RESIDUAL	CASEWI	PERF	TINEWT	
-	.147924	.033209	.109540	038384	43.901085	165.250000	17.000000	.000000
~ ~	. 131882	.029469	.082220	049662		166.750000	6.000000	00000
n =	.11/083	201020.	000000	0.111,083	24.470298	168.250000	3.00000	00000
r ut	100001	020452	0617.10	916140.	507.040070	171 250000	192 000000	00000
, .	.079837	.018135	134190	.054353	323.919312	172.750000	91.000000	000000
7	.069660	.016119	.056570	012990	14H.642050	174.250000	34.000000	600000
60	. 060512	.014372	.287200	.226688	165.128185	175.750000	33.000000	000000.
6 ;	.052332	.012857	086980	.034648	264.963570	Ġ	49.000000	000000
0:	.045056	.011539	000000	045056	150.094604	178.750000	22.000000	000000
- 5	103861.	4910. 191000	00000	- 033617	83.809115	180.250000	6.00000 4.00000	000000
× 61	.027984	.008.144	000000	027984	318,117531	183.250000	- 0	000000
	.023659	.007614	000000	023659	385.188522		31.000000	000000
2.	.019911	.006854	000000	019911	1807.929520	۲.	137.000000	000000
16	.016679	.006155	000000	016679	2714.793304	187.750000	174.000000	00000°
<u> </u>	131541	.00590	000000	113906	1880.855415	189.250000	33.000000	000000
9 5	116769	022624	000000	- 035150	160 654871	166 750000	62 000000	000000
20	.103213	.019884	.232550	. 129337	210.675974	: ?	76.00000	000000.1
21	.090838	.017469	.147630	.056792	611.730278	169.750000	198.000000	0000000.
22	.079599	.015403	.046210	033369	447.461529	171.250000	127.000000	1.000000
23	.069446	.013653	000000	069446	244.094382	172.750000	60.00000	1.000000
24	.060320	.012178	000000	060320	304.878658	۱ج	000000 99	1.000000
25	.052161	.010936	.045050	007111	274.832489	175.750000	51.000000	000000.1
20	.044904	100900	000000	- 044904	200.7003050	177.250000	100.00000	090000
28	505000	2/66/00.	000000	.030403	300.200330	100 25 000	35,00000	00000
29	103283.	.007458	000000	027387	464.697973	180.250000	46 000000	0000001
000	.023570	.006802	000000	023570	50 1, 259804	183.250000	42.000000	1.000000
31	.019833	.006191	000000.	019833	635.158020	184.750000	45.000000	1.000000
32	.016612	.005617	000000	016612	644.835638	186.250000	38.00000	1.0000000
33	.013050	.005073	0000000	013850	2345.410400	187.750000	124.000000	0000001
34	.011493	. 004559	000000	011493	64491.937073	5 •	289.000000	1.000000
50 100 100 100 100 100 100 100 100 100 1	.004001	268500.	000000	1004001	26032 36032	174.250000	13.00000	000000
37	.002585	.003286	000000	002585	864 81689	177.250000	85.00000	000000
38	.002062	.002675	000000	002062	21140.721640	178.750000	170.00000	000000
39	.001638	.002168	000000.	001638	28691.078125	180.250000	183.000000	000000
40	.001294	.001749	.003550	.002256	38887.701172	181.750000	197.000000	000000
41	.001018	.001405	000000	001018	01620.277344	183.250000	328.000000	000000
7:	767000.	.00000	000000	767000-	4967.029338	184.750000	10.00000	000000
2 4	.000621	468000	000000	- 000051	13551.436788	186.250000	29.000000	000000
 	.000481	0000559	000000	10000	104173 234141	180 250000	090000.7	00000
. 4 6	585358	. 059136	000000	58535A	12.819.99	160.750000	900000	000000
47	.557037	.055974	000000	557037	9.510729	162.250000	2.000000	000000
48	.528421	.052520	000000.	528421		163.750000	0 00000 . 9	000000.
49	. 499658	.048848	. 993330	. 193672	•	165.250000	5.000000	000000
	.470897	.045037	.000000	470897	10.910091	166.750000	4.000000	000000.
.	007744.		1		•	· · · · · · · · · · · · · · · · · · ·)))

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52	.413974		.630000	.216026	21.850699	9.7	16.000000	000000
53	.386102	. 033698	.480480	.094378	3.1.449305	171.250000	28.000000	000000
54	.358806	$\boldsymbol{\sigma}$. 185780	172026		•	96.00000	000000
52	. 332213	.027240	.257220	074993		٠:	52.000000	000000
99	. 306439	T.	.278200	028239	115.404661	175.750000	94.000000	000000
57	. 281589	~	.456990	.175401	112.096852		87.000000	000000
58	.257754		331300	.078546	234.251770	178.750000	179.00000	000000.
59	. 235010	.020241	.258990	.023980	282.402748	?	199.000000	000000
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72		.004826	000000	010554	1920.582520			000000
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74	0071	.003487	000000	007135	781.054176			000000
75	.005826	.002958	000000.	005826	3290.677826	181.750000	72.000000	000000
76	.004734	.002504	000000	004734	7329.161316	183.250000	134.000000	000000
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PERF 2) AND VERSUS RESIDUALS. .30 -.60 PLOTS OF VARIABLE(1) VERSUS PREDICTED AND OBSERVED VARIABLE(1.000 + 0 PARAMETERS FROM REAL DATA SET # 2(5 SOURCES) PERF 162 0.000 + 000.0 .7500 + .3750 .8750 .6250 .2500 .1250 .5000 PAGE =0-0 B--73

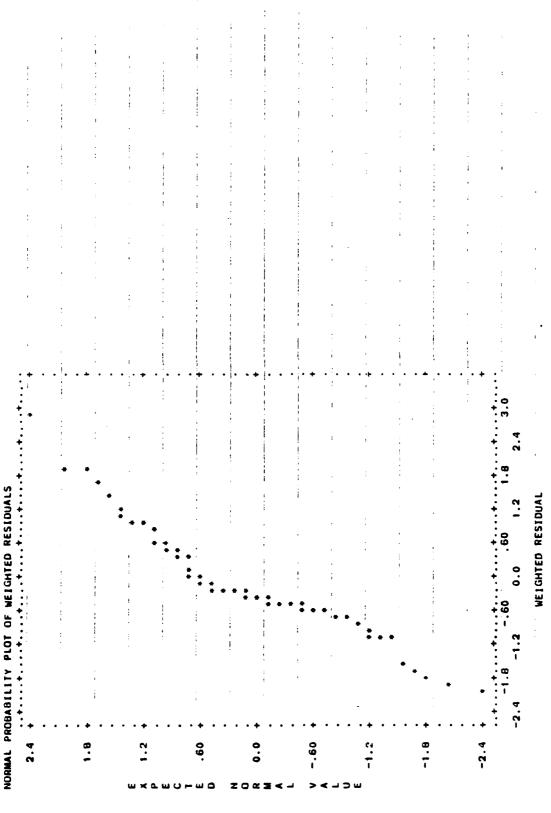
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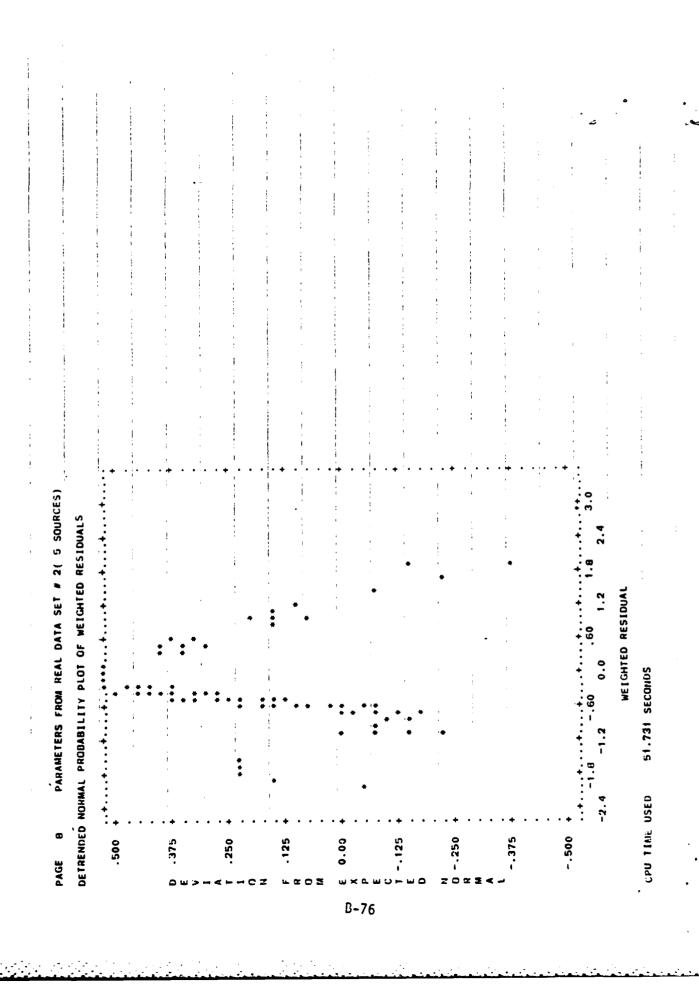
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PREDICTO VERSUS RESIDUALS AND VERSUS RESIDUALS SQUARED 0.0 .40 .35 .05 09. .06 .18 .30 .42 .54 PARAMETERS FROM REAL DATA SET # 2(5 SOURCES) PREDICTO . 23 PLOTS OF PREDICTED VARIABLE HOLD .30 .15 -.30 -.45 0, -PAGE B-74



PARAMETERS FROM REAL DATA SET # 2(5 SOURCES)



PAGE 9

UNDP3R - NONLINEAR REGRESSION 05/22/82 AT 16:23:17

NO MORE CONTROL LANGUAGE.

PROGRAM TERMINATED

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INTERVENING STATEMENTS SKIPPED

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ITERATION 3 HAS THE SMALLEST RESIDUAL SUM OF SQUARES(SUBJECT TO CONSTRAINTS, IF ANY). REMAINING CALCULATIONS ARE BASED ON THE RESULTS OF THIS ITERATION.

PAGE 3 PARAMETERS FROM REAL DATA SET # 3(5 SOURCES)
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PARAMETERS FROM REAL DATA SET # 3(5 SOURCES)

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B-87

SERIAL CORRELATION

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159 165 171 177 183 186 174 PERF 168 2) AND VERSUS RESIDUALS. 162 1) VERSUS PREDICTED AND OBSERVED VARIABLE(186 168 PLOTS OF VARIABLE 162 I D J O

PARAMETERS FROM REAL DATA SET # 3(5 SOURCES)

PAGE

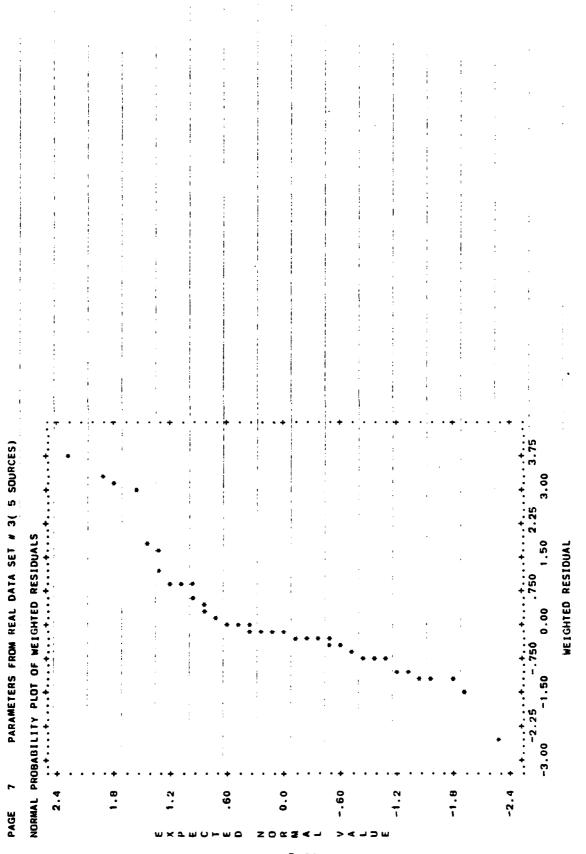
VERSUS RESIDUALS AND VERSUS RESIDUALS SQUARED PARAMETERS FROM REAL DATA SET # 3(5 SOURCES) PLOTS OF PREDICTED VARIABLE HOLD ပ PAGE

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DETRENDED NORMAL PROBABILITY PLOT OF WEIGHTED RESIDUALS WEIGHTED RESIDUAL 57.714 SECONDS CPU TIME USED .500 -.500 -.375 . 250 .125 0.00 -.250 -.125 B-91

PARAMETERS FROM REAL DATA SET # 3(5 SOURCES)

PAGE

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PAGE 9

UMDP3R - NONLINEAR REGRESSION 09/22/82 AT 16:24:32

NO MORE CONTROL LANGUAGE.

PROGRAM TERMINATED

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INTERVENING STATEMENTS SKIPPED

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B-94

NLR. PBRFUN/CUMGAUSS

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THE RAW STATISTIC P(1) + P(2)*X(1)+ ... + P(N)*X(M) IS FORMED AS THE ARGUMENT TO SUBROUTINE MONOR WHICH VIELDS THE AREA UNDER THE GAUSSIAN CURVE. THE FIRST DERIVATIVES OF THE CUMULATIVE GAUSSIAN FUNCTION WITH RESPECT TO PARAMETERS P(1), P(2)..., P(N) ARE ALSO EVALUATED.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 @ DERIVATIVES W/R PARAMETERS 
@ VALUE OF FUNCTION 
@ (1-f)*F LIMITED, DIV FLT PROT
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                                                                                                                 OUTPUT: F - FUNCTION VALUE

DF - DERIVATIVES OF FUNCTION W/R PARAMATERS
                                                                                                                                                               NOTES: IF EVALUATION OF THE WEIGHTING FUNCTION WOULD CAUSE DIVISION BY ZEHO THEN THE ZLRD FACTOR IS RESET TO 10**-38 AND THE FACTORS OF THE WEIGHTING FUNCTION ARE WRITTEN ON LU 21. THE CGNDITION WORD IS ALSO SET TO 1 SO THAT IT MAY MAY BE SENSED IN THE RUNSTREAM AND A BRANCH
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NPAR - NUMBER OF FUNCTION PARAMETERS
IPASS - NUMBER OF DATA PASSES
XLOSS - UTILITY VRBL
INDP - INDEX OF DEP VRBL(NOT USED)
                                                                                                                                                                                                                                                                                                  PROGRAMMER/ORGANIZATION: HOFMOCKEL-JL, CSC
                                                                                                                                                                                                                                                                   PROVIDED TO DUMP FILE 21.
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DOUBLE PRECISION F
DOUBLE PRECISION FACTOR
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DOUBLE PRECISION STPINV
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000115 000116 000117 000118	003	DOUBLE PRECISION XLOSS	UTILITY VRDL(UNUSED) NORMALIZED STATISTIC	
	003 C			
	036	IF (IPASS .EQ. 1) THEN	& GEI UN NORM WIS IST PASS	
_	034	LL = "CALL (NCALL .EQ		
	034	KASE .EQ. 1)		
000120	034	CALL FSETC (0)	& CLR COND WD 1ST PASS	
000121	500	IF (NVAK-NPAR .NE. 2) IMEN LDITE (6 40) NVAD NDAD		
27.000	000	-		
000124		12.		
000125	600	ERRO		
000126	010	!		
000127	900	Z = P(1) + P(2) * X		
000128	021	a V	6 ADD XTRA VRBLS EFFECT	
671000	220			
000130	020	OVON		
000132	036	20 T = 1		
000133	021	1 + 01 = 01		
000134	021			
000135	021	- Z		
000136	036 20	NOE		
000137	l	ENDIF		
000138	600	DF (1) = -SIPINV +	@ DERIVATIVE W/R P(1)	
000139	024	* DEXP (-0.500*Z+Z)		
000140	900	DE (2) = X (1	@ DERIVATIVE W/R P (2)	
000141	015	NPAR .G	& ADD XTRA VRBLS EFFECT	
L'10142	900	H		
000143	900	2		
000144	900	VD = NPAR -2		
000145	036	00 30 1 = 1, 1ENU		
000140	000			
000147	900	10 = 10 + 1		
000149	036 30			
000150		ENDIF		
000151	015	CALL MDNORD (Z, A)	@ AREA UNITER GAUSSIAN	
000152	015	A - 0.		,
000153	021	_	@ RESET CASEWT	
000154	015	F + F		
000155	031	CTOR .LE. 0.	000) THEIL & SHUILD NOT BE 0	
000156	031	z		
000157	031	, A, FACTO	@ SAV DATA IN FILE	
000158	031	SETC (1	A SET CONCITION WORD	
000159	034	CTOR = 1.00-19	@ PREVENT DIVFLT	
000160	031	END1 F		
000161	034	4) / FACT		
000162	-	MBTEE = 0.2500 +		
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000166	240	* + [MB]EE=1.000 }+FACION ;	TOO GOD SERVE FOR	

0/1000	027	WRITE (20 . +) NCALL, KASE.	
000171	027	+ Z, A, X(3)	
000173	036		@ END IST PASS LOGIC
000174	036	IPASS .	P NOTA WIS TO NCAS SUM
000175	9£0	IF (KASE .E	
000176	037	15 = 0.000	e IN LALIZE SUM
000177	036		ACCUMULATE WIS
8/1000	960	KASE .E.U. NCAS	F NOW I'M CAS SUM
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1000	036	Continue	
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000186	003	END	
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00000	012		
000004	012		•
000005	=1:	ان	NAME: PASS*NLR.MONORD
900000	= :	* •	
000007	013	: :	USAGE: CALL MONORD (Z, A)
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000010	2	***	BY SERIES
0000	=	***	HANDBOOK OF MATHEMATICAL FUNCTIONS, AMS 55.
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000032	013 C	•	ALGORITHM: IF (ABS(Z) . LE. 6) IHEN USING ART 26.2.10
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000037	, ,		THE A
000038	2	*:	.0/50
000039	2	*	(X**-1)-(X**-3)+3*(X**-5)-15*(X
000040	012 C	••0	N**(1-))+
000041	2	•	WHERE P(X) + Q(X) = 1.
000042	_ ,	٠.	
000043	- :		APPLICABILITY: ASCII TUNINAN
000045		: ن:د	KEYMORDS: CHAMILATIVE GAUSSIAN, AREA UNDI R GAUSSIAN, NORMAL CURVE
000046	=	* •	
000047		•	RECORD OF MODIFICATIONS: INITIAL PROGRAM 4-27-82
000048		• •	
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011	00062	011	DOUBLE	SION	© SIGN VRBL (==1++N)
011	00063	011	DOUBLE	SION	6 SQRTTWOPI) INVERTED
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011 DOUBLE PRECISION X 012 DOUBLE PRECISION XISQ 011 DOUBLE PRECISION XISQ 011 DOUBLE PRECISION XISQ 011 N = 0.500 011 X = DABS (Z) 012 X = DABS (Z) 013 IF (X GT, 0.000) THEN P 014 X = 0.500 015 IF (X GT, 0.000) THEN P 016 IF (X GT, 0.000) THEN P 017 X = DABS (Z) 018 IF (X GT, 0.000) THEN P 019 IF (X GT, 0.000) THEN P 010 IF (X GT, 0.000) THEN P 011 IF (X GT, 0.000) THEN P 012 IF (X GT, 0.000) THEN P 013 IF (X GT, 0.000) THEN P 014 IF (X GT, 0.000) THEN P 015 IF (X GT, 0.000) THEN P 016 IF (X GT, 0.000) THEN P 017 IF (X GT, 0.000) THEN P 018 IF (X GT, 0.000) THEN P 019 IF (X GT, 0.000) THEN P 010 IF (X GT, 0.000) THEN P 011 IF (X GT, 0.000) THEN P 012 IF (A GT, 0.000) THEN P 013 IF (A GT, 0.000) THEN P 014 IF (A GT, 0.000) THEN P 015 SUM = X GT, 0.000 016 IF (A GT, 0.000) THEN P 017 SUM = X GT, 0.000 018 IF (A GT, 0.000) THEN P 019 IF (A GT, 0.000) THEN P 010 IF (A GT, 0.000) THEN P 011 IN IN IN IN IN IN IN IN IN IN IN IN IN	00065	011	DOUBLE	NO IS	* ACCUMULATION VRBL FOR SUMMATION
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012 DOUBLE PRECISION XISQ 011 DOUBLE PRECISION XSQ 011		012	DOUBLE	SION	e x Inverted, 1.E., 1/x
011 DOUBLE PRECISION XSQ 011 A = 0.5000 011 X = 0.5000 011 IF (X . GT . 0 . 000) THEN 012 XSQ = X * X 012 XSQ = X * X 012 XSQ = X * X 012 XSQ = X * X 013 IF (X . LE . 6 . 000) THEN 013 IF (X . LE . 6 . 000) THEN 014 DO = 3 . 000 015 DO = 3 . 000 016 DO = 3 . 000 017 DO = 3 . 000 018 DO = 3 . 000 019 DO = 3 . 000 011 DO = 3 . 000 011 DO = 3 . 000 012 DO = 3 . 000 013 DO = 3 . 000 014 DO = 3 . 000 015 DO = 3 . 000 016 DO = 3 . 000 017 DO = 3 . 000 018 DO = 3 . 000 019 DO = 3 . 000 010 DO = 3 . 000 011 DO = 3 . 000 012 DO = 3 . 000 013 DO = 3 . 000 014 DO = 3 . 000 015 DO = 3 . 000 017 DO = 3 . 000 018 DO = 3 . 000 019 DO = 0 . 000 010 DO =	9900	012	DOUBLE	NOIS	6 XI : 12
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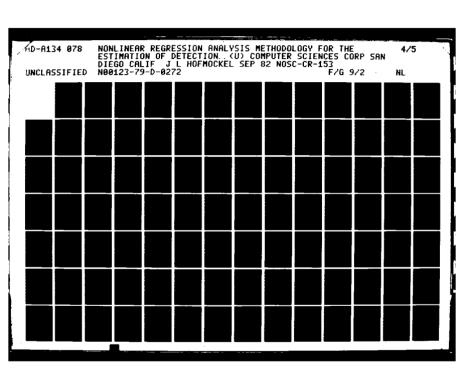
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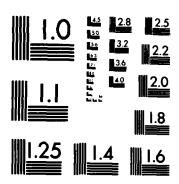
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24	.063176		000000	063176	.005914	169.250000	7.000000	00000
25	030230	344590.312500	028850	001670	. 153726	169.750000	000000.19	000000
26	.013296	<u>ب</u>	.026610	.013314	. 472601	171.250000	124.003000	000000.
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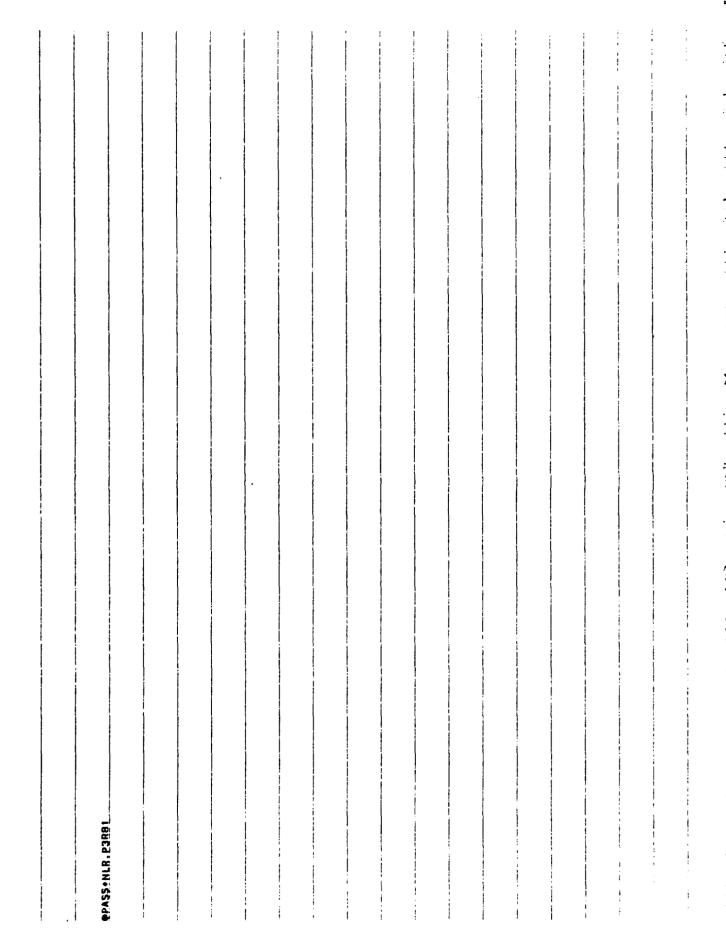
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THE ENDORAN SING NEW FEATURES FOR HIS PRESIDENT STANDARY OF NEW FEATURES FOR HORSEN SING NEW FEATURES FOR STANDARY STANDARY SING NEW SING	PROGRAM REVISED JUNE 1981 MANUAL REVISED — 1981 COPYRIGHT (C) 1981 REGENTS OF UNIVERSITY OF CALIFORNIA 10/07/82	
INPUT INFORMATION	O SEE REMARKS AND A SUMMARY OF NEW FEATURES FOR HIS PROGRAM, STATE NEWS, IN THE PRINT PARAGRAPH.	
	PROGRAM CONTROL INFORMATION	
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28	. 266582	15961	.510254	330300	.069718	.045776	178.750000	179.000000	000000
29	. 234573	15961	.510254	254990	.024417	. 055417	180.250000	199.00000	000000
09	.204812	15961	_	. 284650	•	.034692	181.750000	٠	000000
19	177420	15961	1025	142070	035350	.024325	C 1		000000
62	. 152462	15961	1025	. 197030	•	. 039081	184.750000	101.00000	000000
63		15961	-	.080770	049182	.042011	186.250000		000000
9	109854	12961	_	0/0560	• 1	.063404	187.750000	124.000000	00000
65	.092091	15961	1025	111430	•	063390	189.250000		00000.
9	.024871	12961	-	0,0000	1.024871	.045357	168.250000	22.000000	000000.
67	.019562	15961	-	000000	• 1	093849	169.750000	36.000000	00000
99	.015249	19601	-	0221.10.	•	8867/0.	171.250000	202.000000	000000
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7.1	6EB900.	12861	-	000000	•	12827	175.750000	124.000000	000000
72	.005139	15961	_	000000	•	743202	177.250000	76.000030	00000.
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74	. 002823	12961	-	000000	•	301305	180.250033	17.000000	000000.
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76	.001494	15961	_	000000	• ‡	4 . 492502			00000
77	.001071	15961		000000.	•	4.532344	184.750000		000000.
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JNIVERSITY OF 213) 825-5940	UNIVERSITY OF CALIFORNIA, LOS ANGELES, CA 96024 (213) 825-5940 TWX UCLA LSA PROGRAM REVISED JUNE 1981	
MANUAL REVISED COPYRIGHT (C) 10/07/82	MANUAL REVISED 1981 COPYRIGHT (C) 1981 REGENTS OF UNIVERSITY OF CALIFORNIA 10/07/82 AT 17:22:25	
TO SEE REMARKS THIS PROGRAM.	TO SEE REMARKS AND A SUMMARY OF NEW FEATURES FOR	
POGRAM CONTRE	PROGRAM CONTROL INFORMATION	
/PROBLEM TITL	TITLE IS ' REGRESSION ON REAL DATA'.	
i	VARIABLES ARE 8. FORMAT 15 '{F6.2,F9.5,F12.5,F6.1,5(1X,F1.0))'.	
ui.	NAMES ARE PERF. HOLD, CASEMT, TIMEWT, 11, 12, 13, 14.	
/ KEUKESS 117L	TITLE IS ' PARAMETERS FROM DATA SET # 3 (5 PLATFORMS)'.	
INDI DEPE NUME	INDEPENDENT IS PERF. DEPENDENT IS HOLD. NUMBER IS 2.	
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	.002413	6	157471	.002750	•	4.030356	177.250000	194.00000	000000
	. 001449	_	157471	000000	651.100	4.977259	178.750000	144.00000	C0000
	.000849	9	157471	000000	- 000849	7.952974	100.250000	135.000000	000000
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APPENDIX C

NONLINEAR REGRESSION ANALYSIS COMPUTER PROGRAM PACKAGE

E11017 RLIB70 09/21-10:55:41-(4,)
000001 004 @PACK,P PASS*NLR.
000002 004 @MAP ,PASS*NLR.P3R77
000003 000 IN PASS*NLR.P3RFUN/CUMCAUSS
000004 003 IN PASS*NLR.MDNORD
000005 000 IN N*BMDP77.3RREL
0000005 000 IN N*BMDR7

END ELT.

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UNECE - BMDPAR. LR. PARFUNCUMGAUSS, PARFUN LR. MANDORD, MONDORD AND COMMONDORD, MONDORD AND COMMONDORD, MONDORD COMMONDORD, MONDORD COMMONDORD, MONDORD COMMONDORD, MONDORD COM

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	e Output	10d100 •	IDANI 6			TUPVI &	The same of the sa	TNPUT				COND.	DF. P. X. N. KASE, NVAR, NPAR, 1PASS.	55, INDP)	•	֓֞֝֝֓֓֓֓֓֟֝֓֓֓֓֓֓֓֓֓֓֓֟֝֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓	VARIABLE A(1) AND THE REGRESSION ERS P(1), P(2), P(N), THIS FUNCTION	P3R PROGRAM DESCRIBED IN THE	UCLA BMDP 1977 USERS'S MANUAL PG 464. OR THE 1981	AR REGRESSION OF	IAN FUNCTION IS MADE USINT THE RAW	(())	ENT VARIABLE (PERFORMANCE INDEX) MUST BE	AND THE DEPENDENT	LOING TIME) MUST BE IN THE	COTING A(2). A(3) AND A(4) SHUDLD HAVE INTIAL	X(5). X(NVAR)	I FFERENI	SOUND PROJECTOR IS USED IN THE REGRESSION AND	TO 0 OR 1 TO CONTROL THE	THE PARAMETERS		VARIABLES MUST BE TWO GREATER THAN THE DARBAMETER. A MECCASE DUINTS OUT OF THE CONSTITUTE	A MESSAGE TATALS OUT IT THE		ORD - OBTAINED FROM PASS*NLR.MDNORD			N PARAMETERS		RESSION FUNCTION	USE INPUT CASEW! X(3)	TEX(3)	* ' Z X +	
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FUNCTION PARAMETERS	PASSES	VABL(NOT USED)				FUNCTION W/R PARAMATERS	_	THE ZERC	TIEN ON LU 21, THE	Ξ	•		ר-אר, כאכ) + P(2)+X(1)+ + P(N)+X(M) IS .	SSIAN CURVE. THE FIRST DE	SSIAN FUNCTION WITH	PIN) ARE ALSO EVALUATED.		900000000000000000000000000000000000000	KEGKESSION, SIMILSIECS, GAUSSIAN	PROGRAM 4-7-82			The second of th		6 AREA UNDER GAUSSIAN 6 DERIVATIVES W/R PARAMETERS	P VALUE OF FUNCTION	a (1-F)+F LIMITED, DIV FLT PROT	6 LIGHT ON TOOP INDEX	O DEP VRBI INDEX (UNUSED)	G PARAM INDEX G NUM DATA PASSES(UNUSED)	P VRBL INDEX		CONTINE AVAIL / 4		@ NUMBER PARAMS IN FUNCTION	@ TOTAL NO. VRBLS	© RECRESSION PARAMETERS	SQUESTION INVENTED	& INDEPENDENT VRBL	@ UTILITY VRBL(UNUSED)
AR - NUMBER OF	IPASS - NUMBER OF DATA	DP - INDEX OF DEP		INPUT/OUTPUT: NONE	- FUNCTION VALUE	DF - DERIVATIVES OF FU	ALUATION OF THE WE	CAUSE DIV	IS RESET TO 10**-38 AND THE FACTORS OF TO	NO		PROVIDED TO DUMP FILE 21.	PROGRAMMER/ORGANIZATION: HOFMOCKEL-JL,		ALGORITHM: THE RAW STATISTIC P(1)		w	PARAMETERS P(1), P(2)	APPLICABILITY: ASCII FORTRAN		NETWONDS: BMDF//, NUNLINEAR, RECK	RECORD OF MODIFICATIONS: INITIAL		WAIVERS: NONE	START EDIT PAGE		DOUBLE PRECISION A	PRECISION F	DOUBLE PRECISION FACTOR	INTEGER 1 END		INTEGER 17	EGER IV	INTEGER KASE	DOUBLE PRECISION LMBTEE		NPAR	R NVAR		19894228040143	1510N	DOUBLE PRECISION XLOSS
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000 C** LIMITATIONS: THE INDEPENDENT VARIABLE (PERFORMANCE INDEX) MUST BE 000 C** THE FIRST POSITION I.E. X(1) AND THE DEPENDENT 000 C** THE FIRST POSITION I.E. X(1) AND THE DEPENDENT 000 C** THE FIRST POSITION I.E. X(1) AND THE DEPENDENT 000 C** THE SECOND 000 C** TO ALLOW FOR DEFERENT V-INTERCEPTS IF MREE INAN 000 C** TO ALLOW FOR DEFERENT Y-INTERCEPTS IF MREE INAN 000 C** TO ALLOW FOR DEFERENT Y-INTERCEPTS IF MREE INAN 000 C** TO ALLOW FOR DEFERENT Y-INTERCEPTS IF MREE INAN 000 C** TO ALLOW FOR DEFERENT Y-INTERCEPTS IF MREE INAN 000 C** TO ALLOW FOR THE PARAMETERS ESTIMATES. 000 C** WARNINGS: NO. OF VARIABLES MUST BE TWO GREATER THAN THE 000 C** WARNINGS: NO. OF VARIABLES MUST BE TWO GREATER THAN THE 000 C** SUBPROGRAMS REQUIRED: MUNDRD - OBIAINED FROM PASS*NIR.MDNORD 000 C** THOUT: P - REGRESSION PARAMETERS 000 C** TO ALLOW FOR THOUTH ON THE SECOND IN N = 1, USE INPUT! S AND N = 2, RECALCULATE X(3) 000 C** NAME - NUMBER OF FUNCTION PARAMETERS 000 C** NAME - NUMBER OF FUNCTION PARAMETERS 000 C** NAME - NUMBER OF FUNCTION PARAMETERS 000 C** NAME - NUMBER OF FUNCTION PARAMETERS 000 C** NAME - NUMBER OF FUNCTION PARAMETERS	0024		TATISTIC P(1) + P(2) • X(1),
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XLOSS - UTILITY VRBL	INPUT/OUTPUT: NONE	THE AND INCOMES — TO SERVE SHEET	<u>.</u>	ALUATION OF THE WEIGHT	CAUSE DIVISION BY ZERO THEN	IS RESET TO 10**-38 AND THE	ING FUNCTION ARE WRIT	ION WORD IS	SENSEU IN	PROVIDED TO DOMP FILE 21.	DDDGDAMMED /DDGAN12AT10N: HOFMCKE1		ALGORITHM: THE RAW STATISTIC P(1)	FORMED AS THE ARGUMENT	THE AREA UNDER THE GAUS	;	APPLICABILITY: ASCII FORTRAN	KEYWODDS: BAND27 NON! INEAD BECOESCION		RECORD OF MODIFICATIONS: INITIAL PROGRAM		WAIVERS: NONE		START EDIT PAGE	DOUBLE PRECISION A	PRECI	PRECI			16	INTEGER IPASS	INTEGER IV	•	Z			R NVAR	PRECISION	DOUBLE PRECISION SIPINV	DOUBLE PRECI	PRECISION X	PREC1S10N	;	ALL = NCALL + 1	AR-NPAR .NE. 2)	CODMAT 4 CODE CODE CODE	CHURCA/PARA	AVAK . 14: NITH
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C-10

000113	000	ENDIF	
000114	000	Z = P(1)+P(2)+X(1)	& FORM STAT
000115	000	IF (NPAR .GT. 2) THEN	ADD XTRA VRBLS EFFECT
911000	000	A = >1	
000117	000	IP * 2	
000118	000	IEND = NPAR -2	
611000	000	00 15 1 = 1, IEND	
000150	000	1 + d1 = d1	
000121	000	IV = IV + 1	
000122	000	2 = 2 + P(IP)*X(IV)	
000123	000 15	CONTINUE	
000124	000	ENDIF	
000125	000	CALL MDNORD (Z, A)	# AREA UNDER GAUSSIAN
000126	000	F = 1.0 - A	
000127	000	IF (N .GT. 1) THEN	© RESET CASEMI
000158	000	FACTOR = F - F+F	
000129	000	1F (FACTOR .LE. 0.000) TI	HEN & SHOULD NOT BE 0
000130	000	WRITE (21, +) NCALL, K	ASE,
000131	000	Z, A, FACTOR	SAV DATA IN FILE
000132	000	CALL FSETC (1)	SET CONDITION WORD
000133	000	FACTOR = 1.00-38	OR = 1.00-38 • PREVENT DIVELT
000134	000	ENDIF	
000135	000	LMBTEE = 0.2500 + X (4)	
000136	000	# (B) x	
000137	000	. (LMBTEE + LMBTEE) /	
000138	000	+ ((DEXP(-LMBTEE)	
O 000139	000	+ + LMBTEE-1.0D0)+FACTOR)	
- 000140	000	ENDIF	
1 000141	000	IF (N .EQ. 3) THEN	◆ DEBUG DATA FILE
000142	000	WRITE (20, +) NCALL, KAS	_
000143	000	* Z, A, X(3)	
000144	000	ENDIF	
000145	000	RETURN	
000146	000	END	

END ELT.

	000001	000	ALIBYO 00/11/2:33:33/103/
009 •	00000	600	* x
009 • • • NAME: PASS*NIR.MINORD 009 (2) 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	0003	600	
009 C: NAME: PASS*NIR, MINGRO 009 C: USAGE: CALL MDNORD (X, A) 009 C: BY CONTINUED FRACTION USING ART: 26.2.1 009 C: BY CONTINUED FRACTION USING ART: 26.2.1 009 C: LIMITATIONS: INDUT ARGUMENTS X AND A MUST BE DOU 009 C: MARNINGS: NONE 009 C: SUBPROGRAMS REQUIRED! NONE 009 C: ARGUMENTS: 009 C: ARGU	00000		
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009 C: HANDOOR CETTER THE THE THE THE THE THE THE THE THE THE	9000		CALL MONOBO (X
009 C** PURPOSE: EVALUATE THE RREA UNDER THE GAUSSTAN DI 009 C** LIMITATIONS: INPUT ARGUMENTS A AND A MUST BE DOU 009 C** LIMITATIONS: INPUT ARGUMENTS A AND A MUST BE DOU 009 C** SUBPROGRAMS REQUIRED: NONE 009 C** SUBPROGRAMS REQUIRED: NONE 009 C** SUBPROGRAMS REQUIRED: NONE 009 C** SUBPROGRAMS REQUIRED: NONE 009 C** INPUT/DUTPUT: NONE 009 C** OUTPUT: A 009 C** OUTPUT:	8000		
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009 C** LIMITATIONS: INPUT ARGUMENTS X AND A MUST BE DOUGO C** CALMITATIONS: INPUT ARGUMENTS X AND A MUST BE DOUGO C** CALMINGS: NONE 009 C** CALMINGS: NONE 009 C** CALMINGS: NONE 009 C** CALMINGS: NONE 009 C** CARGUMENTS: NONE 009 C** CARGUMENTS: NONE 009 C** CARGUMENTS: NONE 009 C** CALGORITHM Y THE CONTINUED FRACTION IN THE COURT OF C** CALGORITHM F F (ABS(X) . LE. 3) THEN USING ART 2 009 C** CALGORITHM F F (ABS(X) . LE. 3) THEN USING ART 2 009 C** CALGORITHM F F (ABS(X) . LE. 3) THEN USING ART 2 009 C** CALGORITHM F F (ABS(X) . LE. 3) THEN USING ART 2 009 C** CALGORITHM F F (ABS(X) . LE. 3) THEN USING ART 2 009 C** CALGORITHM F F (ABS(X) . LE. 3) THEN USING ART 2 009 C** CALGORITHM F F CANTINUED FRACTION IN THE COURT OF C** CALGORITHM F F CANTINUED FRACTION IN THE COURT OF C** CALGORITHM F CAUSIAN CANTINUED FRACTION IN THE COURT OF C** CAPPLICABILITY: ASCII FORTRAN COURT OF C** CAPPLICABILITY: ASCII FORTRAN COURT OF C** CAPPLICABILITY: ASCII FORTRAN COURT OF C** CAPPLICABILITY: ASCII FORTRAN COURT OF C** CAPPLICABILITY: CAPPLICABILITY	0100		
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009 C: UMITATIONS: IMPUT ARIUMENTS X AND A MUST BE DOU 009 C: WARNINGS: NONE 009 C: WARNINGS: NONE 009 C: WARNINGS: NONE 009 C: ARGUMENTS: . 009 C: ARGUMENTS: . 009 C: ARGUMENTS: . 009 C: INDUT/DUTPUT: NONE 009 C: OUTPUT: A 009	2012		
009 C++ 009 C+	0013		INPUT ARGU
009 C** WARNINGS: NONE 009 C** SUBPROCRAMS REQUIRED: NUNE 009 C** ARGUMENTS: . 009 C** INPUT: X 009 C** INPUT: X 009 C** OUTPUT: X 009 C** OUTPUT: A 009 C**	0014		MDNORD MUST BE CALLED FROM ASCII COMPILED PROGRAM.
0.09 C++ WARNINGS: NONE	3015	1	
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009 C+++++++++++++++++++++++++++++++++++	7100		
009 C++ 009 C+	019	,	SUBPROGRAMS REQUIRED: NONE
009 C++ ARGUMENTS: . 010 U -+ INPUT: X 009 C++ OUTPUT: X 009 C++ OUTPUT: NGNE 009 C++ OUTPUT: NGNE 009 C++ OUTPUT: A 009 C++ OUTPUT: A 009 C++ OUTPUT: A 009 C++ OUTPUT: A 009 C++ OUTPUT: A 009 C++ OUTPUT: A 009 C++ OUTPUT: A 009 C++ OUTPUT: A 009 C++ OUTPUT: A 009 C++ OUTPUT: A OUTPUT:	9019		
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009 C** 001PUT: A 009 C** 001PUT: A 009 C** NOTES: NONE 009 C** NOTES: NONE 009 C** ALGORITHM* IF (ABS(X) .LE, 3) THEN USING ART 2 009 C** CONTINUED FRACTION IN THE CONTINUED FRACTION IN THE CONTINUED FRACTION IN THE CONTINUED FRACTION IN THE CONTINUED FRACTION IN THE CONTINUED FRACTION IN THE CONTINUED FRACTION IN THE CONTINUED FRACTION IN THE CONTINUE OF TRACTION IN THE CONTINUE OF TRACTION IN THE CONTINUE OF TRACTION IN THE CONTINUE OF TRACTION IN THE CONTINUE OF TRACTION IN THE CONTINUE OF TRACTION IN THE CONTINUE OF TRACTION IN THE CONTINUE OF TRACTION IN THE CONTINUE OF TRACTION IN THE CONTINUE OF TRACTION IN THE CONTINUE OF TRACTION IN THE CONTINUE OF TRACTION IN THE CONTINUE OF T	024	600	INPUT/OUTPUT: NOWE
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009 C** NOTES: NONE 009 C** NOTES: NONE 009 C** PROGRAMMER/ORGANIZATION: HOFMUCKEL-JUL/CSC 009 C** ALGORITHM IF (ABS(X) .LE. 3) THEN USING ART 2 009 C** OTHERWISE IF (ABS(Z) .GT. 3) THEN UNDER 009 C** OTHERWISE IF (ABS(Z) .GT. 3) THEN UNDER 010 C** OTHERWISE IF (ABS(Z) .GT. 3) THEN UNDER 010 C** OTHERWISE IF (ABS(Z) .GT. 3) THEN UNDER 010 C** WHERE Z(X) = EXP(-0.5*X**2)/SGRI(2*PI) 009 C** APPLICABILITY: ASCII FORTRAN 009 C** RECURD OF MODIFICATIONS: INITIAL PROGRAM 6-10-82 009 C** WAIVERS: NONE 009 C** WAIVERS: NONE 009 C** WAIVERS: NONE 009 C** OTHERWISE IF (Z) ** A B VECTOR 009 C** OTHERWISE IF (Z) ** A B VECTOR 009 C** OTHERWISE IF (Z) ** A B VECTOR 009 C** OTHERWISE IF (Z) ** A B VECTOR 009 C** OTHERWISE IF (Z) ** A B VECTOR 009 C** OTHERWISE IF (Z) ** A B VECTOR 009 C** OTHERWISE IT PAGE 009 C*	026	600	*
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009 C++ ALGORITHM IF (ABS(X) .LE. 3) THEN USING ART 2 009 C++ EVALUATE THE CONTINUED FRACTION IN THE 009 C++ O(X) = 0.5-Z(X) + (X/1- X+2/3+ 2+4+2/5- 009 C++ OTHERWISE IF (ABS(Z) .GT. 3) THEN U 010 C++ O(X) = 0.5-Z(X) + (1/X+ 1/X+ 2/X+ 3/X+ 4/ 010 C++ O(X) = 0.5-Z(X) + (1/X+ 1/X+ 2/X+ 3/X+ 4/ 010 C++ O(X) = 0.5-Z(X) + (1/X+ 1/X+ 2/X+ 3/X+ 4/ 010 C++ O(X) = 0.5-Z(X) + (1/X+ 1/X+ 2/X+ 3/X+ 4/ 010 C++ O(X) = 0.5-Z(X) + (1/X+ 1/X+ 2/X+ 3/X+ 4/ 009 C++ O(X) = 0.5-Z(X) + (1/X+ 1/X+ 2/X+ 3/X+ 4/ 009 C++ O(X) = 0.5-Z(X) + (1/X+ 1/X+ 2/X+ 3/X+ 4/ 009 C++ O(X) = 0.5-Z(X) + (1/X+ 1/X+ 2/X+ 3/X+ 4/ 009 C++ O(X) = 0.5-Z(X) + (1/X+ 1/X+ 2/X+ 3/X+ 4/ 009 C++ O(X) = 0.5-Z(X) + (1/X+ 1/X+ 2/X+ 3/X+ 4/ 009 C++ O(X) = 0.5-Z(X) + (1/X+ 1/X+ 2/X+ 3/X+ 4/ 009 C++ O(X) = 0.5-Z(X) + (1/X+ 1/X+ 2/X+ 3/X+ 4/ 009 C++ O(X) = 0.5-Z(X) + (1/X+ 1/X+ 2/X+ 3/X+ 4/ 009 C++ O(X) = 0.5-Z(X) + (1/X+ 1/X+ 2/X+ 3/X+ 4/ 009 C++ O(X) = 0.5-Z(X) + (1/X+ 1/X+ 2/X+ 3/X+ 4/ 009 C++ O(X) = 0.5-Z(X) + (1/X+ 1/X+ 2/X+ 3/X+ 4/ 009 C++ O(X) = 0.5-Z(X) + (1/X+ 1/X+ 2/X+ 3/X+ 4/ 009 C++ O(X) = 0.5-Z(X) + (1/X+ 1/X+ 2/X+ 3/X+ 4/ 009 C++ O(X) = 0.5-Z(X) + (1/X+ 1/X+ 2/X+ 3/X+ 4/ 009 C++ O(X) = 0.5-Z(X) + (1/X+ 1/X+ 2/X+ 3/X+ 4/ 009 C++ O(X) = 0.5-Z(X) + (1/X+ 1/X+ 2/X+ 3/X+ 4/ 009 C++ O(X) = 0.5-Z(X) + (1/X+ 1/X+ 2/X+ 3/X+ 4/ 009 C++ O(X) = 0.5-Z(X) + (1/X+ 1/X+ 2/X+ 3/X+ 4/ 009 C++ O(X) = 0.5-Z(X) + (1/X+ 1/X+ 2/X+ 3/X+ 4/X+ 4/X+ 4/X+ 3/X+ 4/X+ 4/X+ 4/X+ 4/X+ 4/X+ 4/X+ 4/X+ 4	200	ب ر	
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009 C++ 010 C+- 010 C+	450	600	
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010 C++ 009 C+	037	010	_
009 C++ 009 C+	038		XP(-0.5+X++2)/SQRT(2+P1)
009 C++ APPLICABILITY: ASCII FORTRAN 009 C++ 009 C++ 009 C++ 009 C++ 009 C++ 009 C++ 009 C++ 009 C++ 009 C+- 0	039		
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009 C** KEYWORDS: CUMULATIVE GAUSSIAN, AREA UNDER GAUSSI 009 C** RECORD OF MODIFICATIONS: INITIAL PROGRAM 6-10-82 009 C** WAIVERS: NONE 009 C 00	041		
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009 C++ RECORD OF MODIFICATIONS: INTITAL PROGRAM 6-10-82 009 C++ WAIVERS: NONE 009 C-+ WAIVERS: NONE 009 C-+ DOUBLE PRECISION A AREA UNDER 009 DOUBLE PRECISION A A A B A B A B	043		
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009 DOUBLE PRECISION ANBN (2) G A U VECTUR 009 DOUBLE PRECISION DIFN G DIFFERENCE 009 DOUBLE PRECISION FN (2) G FRACT VAL.	020	600	PRECISION A
009 DOUBLE PRECISION CUET (2) TO CUEFFICIENT 009 DOUBLE PRECISION FN (2) TO FERROCE 000 LAYEOFT (2) TO FERROCE 000 LAYEOFT (2) TO FERROCE 000 LAYEOFT (2) TO FERROCE (2)	100	600	PRECISION AND (Z). WAS B VECTOR ART 3.
009 DOUBLE PRECISION FN (2) & FRACT VAL.	2002		PRECISION COEF (2) & COEFFICIENIS AND
OUG COUBLE PRECISION IN (Z) TARCI VAL.	1053 1053		PRECISION DIFN
	400		FR (Z) P FRACI VAL.

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000056	600	INIEGER J	⊕ COL INDEX
000057	600	1	# NYH TERM INDEX
000058	010	DOUBLE PRECISION MIRX (2, 2)	P A. B MATRIX
00000	010	PRECISION SGN	THE PRESIDENCE SIGN FLIP FLOP
000000	600	PRECISION STRING	# SQRT(TWOPI) INVERTED
190000	600	/ 0.3989422	
000062	010	PRECISION	ACCUMULATES X++2 SUM
000003	010	PRECISION	S IN O S S IN O
000064	600	PRECISION	M ABSOLUTE VALUE OF X (ARG INPUT)
000065	600	ı	9 X+12
. 99000	500 0	UBLE PRECISION 2	T GALUS LICE (TOX A S.D. TA MEAN)
00000	n (17 (X .EQ. 0.000) THEN	6 CDECIAL CACE W.D
0000	900	•	
60000	000	X Y DABS (X)	● LICE DOC ADC
00000	600	× * * * * * * * * * * * * * * * * * * *	2 × 1 × 2 × 2 × 2 × 2 × 2 × 2 × 2 × 2 ×
000072	600	FN (1) = 0.000	* PRESETS FOR RECURSIVE CALC
000073	600 .	2 = 0	
000074	010	XA .GT.	• ART 26.2.14 INITIAL
0000075	600	COEF (1) = XA	
920000	600	COEF (2) = 1.0D0	
000017	010	MIRX (1, 1) = 1.000	
0000078	010	MIRX (2, 1) = XA	
00000	010	Et.SE	
080000	010	COEF (1) = 1.0D0	6 ART 26.2.15 INITIAL
000001	010	CUEF (2) = -X50	
000082	010	SUMX2 = XSQ	
₹ 000083	010	ī	
000084	010	-	
000085	012	2, 1) =	
980000	010		
000087	010		
000088	010	MTRX (2, 2) = 1.000	
00000	010	6 = 1, 30	@ LOOP THRU N TERMS
060000	010	(1)=0	e to GET NTH FRACT
160000	600	N (2) =	
00000	010	XA .LE. 3.000)	
£60000	010	JEF (1) =	
000094	010	2	
66000	600	AND TO SAME	4 LUL 1 LUUF
00000			4 301-1210-1
960000	009 10)	
660000	009 20	CONTINUE	
0001000		FN (2) # FN (1)	® SAV PRIOR FRACT
101000	010	FN (1) =	© NTH FRACTIONAL
000102	600	. ANBN (1) / ANBN (2)	
000103	010	BS (FN12)	CONVERG CRITERION
000104	600	-1	
000105	010	GO TO 40	• ENDUGH TERMS
90100	010	XA .GT. 3.000)	
000107	600	COEF (2) = COEF (2)+1.0D0	
000108	010		
о,	010	# 	
000110	010	<u>.</u>	1.13
11000	5	_	
•	<u> </u>	a g princip	

	TE END N TERMS LOUP	● USE TAIL AREA, X<0			-					
MIRX (2, 2) = MIRX (2, 1) MIRX (1, 1) = ANBN (1) MIRX (2, 1) = ANBN (2)	CONTINUE Z = STPINV-DEXP (-0.5D0+XSQ)	1 0	× .GT. -A + 1	RETURN END						

NAMA NAMA NAMA NAMA NAMA NAMA NAMA NAMA	
000002 009 MRITE (6 , 10) 000003 009 10 FORMAT (' TEST PROCOCOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO	
000003 009 WRITE (6 , 10) 000004 009 10 FORMAT ('TEST PROG 000005 009	
000004 009 10 FORMAT ('TEST PROG 000005 009	
000005 0009 0009 0009 0009 0009 0009 00	
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000009 009 • ' DEVIATIONS FROM 000009 009 • ' FOLLOWED BY THE A 000011 009 • ' FOLLOWED BY THE A 000012 009 • ' FOLLOWED BY THE A 000013 009 • ' FOLLOWED BY THE A 000013 009 009 000014 000 009 000014 000 009 000 000 000 000 000 000 000 00	
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000010 009	
000011 009 * ' ENTER @EOF TO ST 000012 009 20 CONTINUE 000013 009 READ (S. *, END=30 000014 009 CALL MDNGRD (Z. A) 000015 010 010 WRITE (G. 15) Z. A 000015 010 010 WRITE (G. 15) Z. A 000016 010 010 WRITE (G. 15) Z. A 000017 009 CALL MDNGRD (FIO. 6.2X, F 000017 009 CONTINUE 000019 009 END END END END END END END END END END	
000012 009 20 CONTINUE 000013 009 READ (5, *, END=30 000014 009 CALL MDNORD (2, A) 000015 010 ENTE (6, 15) Z, A 000017 009 GD TO 20 000017 009 GD TO 20 000018 009 3D CONTINUE 000019 009 STOP 'NORMAL TSTMDN 000020 009 END END ELI. END END END END END END END END END END	
000013 009 READ (5, *, END=30 000014 009 CALL MDNORD (2, A) 000015 010 WRITE (6, 15) Z, A 000015 010 012 15 FORMAT (F10.6,2X, F 000016 009 3D CONTINUE 000018 009 STOP ' NORMAL TSTMDN 000020 009 STOP ' NORMAL TSTMDN 000020 009 END END END END END END ENTER ACH SALLGIT CHARACTER (2) ENTER ACH SALLGIT CHARACTER (2) ENTER ACH SALLGIT CHARACTER (2) ENTER ACH SALLGIT CHARACTER (2) ENTER ACH SALLGIT CHARACTER (2) ENTER ACH SALLGIT CHARACTER (2) ENTER ACH SALLGIT CHARACTER (2) ENTER ACH SALLGIT CHARACTER (2) ENTER ACH SALLGIT CHARACTER (2) ENTER ACH SALLS (2) ENTER ACH S	
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000015 010 WRITE (6. 15) Z. A 000016 012 15 FORMAT (F10.6.2X, F 000017 009 GD TO 20 CON011NUE 000018 009 3D CON11NUE 000020 009 STOP ' NORMAL TSTMDN 000020 009 STOP ' NORMAL TSTMDN 000020 009 END STOP ' NORMAL TSTMDN TEST PROGRAM FOR KONORD (AREA UNDER GAUSS) AFTER EACH SOLICIT CHARACTER (2) ENTER THE NUMBER OF STANDARD DEVIATIONS FROM ZERO MEAN (+ DR -) FOLLOWE ENTER ALOR TO STOP O00000000000000000000000000000000000	
000016 012 15 FORMAT (F10.6,2X, F 000018 009 GD TO 20 CD00019 009 STOP ' NORMAL TSTMDN 000020 009 STOP ' NORMAL TSTMDN 000020 009 STOP ' NORMAL TSTMDN 000020 009 END END END END END END END ENDER GAUSSI AFTER EACH SOLICIT CHARACTER (2) ENTER THE NUMBER OF STANDARD ENTER THE	
000017 009 GD TO 20 000018 009 3D CDM11NUE 000020 009 STOP 'NORMAL TSTMDN 000020 009 END END END ELI. END ELI. END ELI. END ELI. END ELI. END ELI. END ELI. END ELI. END EROCH AGRAM FOR KDNORD (AREA UNDER GAUSSI THE PRUCRAM WILL ECHO THE NO. S.D. FOLLOWE ENTER JO TO STOP ENTER JO TO TO STOP ENTER JO TO TO STOP END ENTER JO TO STOP END ENTER JO TO STOP END ENTER JO TO TO STOP END ENTER JO TO STOP END ENTER JO TO STOP END ENTER JO TO STOP END ENTER JO TO STOP END ENTER JO TO STOP ENTER JO TO STOP END ENTER JO TO STOP ENTER JO TO	
000018 009 3D CONTINUE 000019 009 STOP 'NORMAL TSTMDN 000020 009 END END END END END END END END END END	
### ##################################	
END EL1. END EL1. END EL1. TEST PROGRAM FOR KDNORD (AREA UNDER GAUSSI AFTER EACH SOLICIT CHARACTER (2) ENTER THE NUMBER OF STANDARD DEVIATIONS FROM ZERO MEAN (+ OR -) HE PROGRAM WILL ECHO THE NO. S.D. FOLLOWE 1.000000 .00000000000000000000000000000	
END EL1. #XQF NLR.TSTIMDNORD TEST PROGRAM FOR KDNORD (AREA UNDER GAUSS) AFTER EACH SOLICIT CHARACTER (2) ENTER THE NUMBER OF STANDARD DEVIATIONS FROM ZERO MEAN (+ DR -) THE PROGRAM WILL ECHO THE NO. S.D. FOLLOWE 1	•
END ELI. TEST PROGRAM FOR IGNORD (AREA UNDER GAUSSI AFTER EACH SOLICIT CHARACTER (2) ENTER THE NUMBER OF STANDARD DEVIATIONS FROM ZERO MEAN (+ OR -) DEVIATIONS FROM ZERO THE NO. S.D. FOLLOWE ENTER -4.OF TO STOP 9.000000 .00000000000000000000000000000	
#XQF NLR.TSTADNORD #XAFER EACH SQUILCT CHARACTER (≥) ENTER TAC SQUILCT CHARACTER (≥) ENTER THE NUMBER OF STANDARD DEVIATIONS FROM ZERO MEAN (+ OR -) THE PROGRAM WILL ECHO THE NO. S.D. FOLLOWE ENTER "LOF TO STOP" 9.000000 .0000000000000000000000000000	
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AFTER EACH SOLICIT CHARACTER (≥) AFTER EACH SOLICIT CHARACTER (≥) AFTER EACH SOLICIT CHARACTER (≥) DEVIATIONS FROM ZERO MEAN (+ OR -) THE PROGRAM WILL ECHO THE NO. S.D. FOLLOWE ENTER -4OF TO STOP -0.000000 .000000000000000000000000000	
ENTER LAURANGER OF STANDARD DEVIATIONS ROLL ENTER THE NUMBER OF STANDARD DEVIATIONS FROM ZERO MEAN (+ OR -) THE PRUGRAM WILL ECHO THE NO. S.D. FOLLOWE ENTER JCD TO STOP 000000000000000000000000000000000000	
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C-16	STOP NORMAL TSTMDNORD STOP		
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APPENDIX D

INPUT DATA BASE
COMPUTER PROGRAM PACKAGE

	USAGE: #XOT PASS-NIR, FILEPRUC		MAT INPUT DATA	REGRESSION ANALYSIS PROGRAMS TO A FORMAT	SIS		_	PERMITS ADDING TO THE P		INDIVIDUAL FILES.	MARKINGS: NONE		SUBPROGRAMS REQUIRED: MCNOR (IMSL-8 LIBRARY)		ANGUMENIUS: MONE	INPUT: FILES ADDED TO RUISTREAM		INPUT/DUTPUT: NONE	CARTONIC CARTONIC CARE MOTOREM ON 111 D	ינים נור שייורים מו רם	NOTES: NONE		PROGRAMMEN/UNGANIZALIUM: MUTMUCKEL-UL/COC	ALGORITHM: READ DATA FROM RUNSTREAM, REFORMAT FOR	INPUT TO THE MONLINEAR REGRESSION			APPLICABILITY: ASCII FORTRAN	PENDONE, MANITHEAD DECORECTION UNITED	DEMANCE INDEX.		RECURD OF MODIFICATIONS: INITIAL PROGRAM 8-10-82		AND LEAST NOW	DIAKI EDIT PAGE	9 APEA UNITED GALISCIAN	GER 1 P INDEX VABL	1Y (5) • 2ND 0	•	•	HBDA / 0.25 / & WEIGHTING	SER NREC	DE VIVOI DANI &	-	7 7 7	•
008 000	•	÷:	:	• • O B C • •		:	÷		900	008 008	ن	:	: :	:	900				900		•	• i	• • • • • • • • • • • • • • • • • • •	٠.	:		:	• :	800	ن		•	٠ ن	•	800	800	002	900	900	005	200	200	900	900	900	0
00000	00000	00000	00000	90000	800000	600000	010000	10000		0000		0000016	000017	810000	00000	000021	000052	000033	0 000024	000056	000027	000028	000030	000031	000032	000033	000034	000035	000036	0000	000039	000040	000041	000042	000043	0000	000046	000047	000048	000049	. 000050	000021	000052	E50000	4.0000°	ccAnn

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PELT, L NLR.MAIN/FILEPROC ELTOT7 RLIB70 09/16-11:24:14-(9,) 0000001 009 C+ NAME: PASS+NLR.MAIN/FILEPROC

A COLOR DE LA COLOR DE LA COLOR DE LA CASA DE LA COLOR DE LA CASA DE LA COLOR DE LA CASA DEL CASA DE LA CASA DEL CASA DE LA CASA DE

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FORMAT (' ADD INPUT D. NREC = 0 DO 40 K = 1, 200 READ (5, 0, END = 5; (X(4), J=1, 9) IF (X(4), GT. 0.0) NREC = NREC + 1 CALL MONOR (X(2), Y (1) = X (1) Y (2) = 1.0 - A Z = -20.0 + 0.125; CALL MONOR (Z, A Y (2) = 1.0 - A Y (2) = 1.0 - A Y (2) = 1.0 - A Y (2) = 1.0 - A Y (3) = (LAMBDA; (EXP(-LAMBDA; (EXP(-LAMBDA; Y (4) = X (4) DO 20 J = 5, 9 IY (4) = 1X Y (4) = 1X	TA'.			THER	A)	+ 0.75 • SET UP 0/P BUFFER		(1) • SET UP FOR INITIAL WIS	X(4) 1002./		• •		(X(.)) . SET DUMAY VORIS		WRITE A REC IN O/P FILE		, F12.5.				•	204	
	- 6	D (5, 4, END =	X(J), J=1, 9)	F (X(4) .GT. 0.0)	ğ	1) = X (1)	1.0	- · · · ·	§ ~	-LAMBDA		(1.0 - A) • A)			WRITE (8, 30)	· (\(\(\(\) \) \(\)	30 FORMAT (F6.2, F9.5	f6.1, 512)	40 CONTINUE	WRITE (6, 60)	-	B DY NO.	MORMA

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<u>.</u>

WAGT NIR.FILEPROC ADD INPUT DATA TO RUNSTREAM WADTE 99 FORMATTED DATA RECORDS ON LU 8

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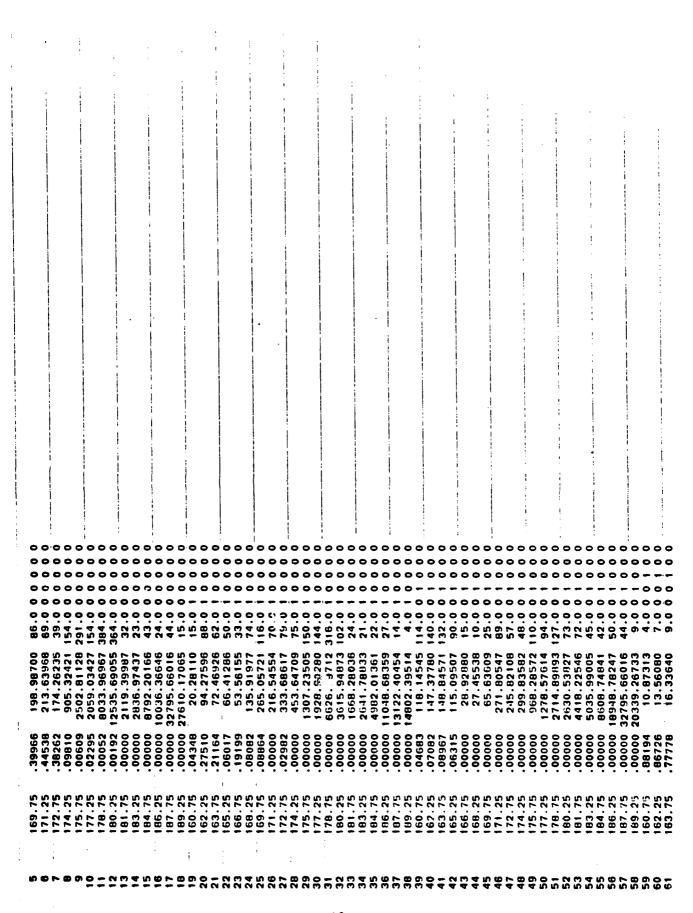
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MYREC = 0 CONTINUE WRITE (6, 10) FORMAT (' ADD INPUT DATA TO '' READ (5, 15, END = 70) HFDR FORMAT (A80) NIGT = 1, 200 READ (5, 4, END = 50) I, J, (X(L), L=1, 6) IF (X(S) .GT . 0.0) THEN WREC = NREC + 1 & (S) / 3600.0 FEAD (5, 4, END = 50) I, J, (X(L), L=1, 6) IF (X(S) .GT . 0.0) THEN WREC = NREC + 1 & (S) / 3600.0 Z = -20.0 + 0.125*Y (1) / 4 / 1 & (S) / 3 / 4 / 1 & (S) / 3 / 4 / 1 & (S) / 3 / 4 / 1 & (S) / 3 / 4 / 1 & (S) / 3 / 4 / 1 & (S) / 3 / 4 / 1 & (S) / 3 / 4 / 1 & (S)	INITIAL TGT COUNT			P INCR TGT COUNT	The state of the second st		SET UP O/P BUFFER	FRACT HOLD TIME	SET FOR INITIAL WTS	47 /8 TN11121 WT EST			SET UP DUMMY VRB!				WRITE A REC IN O/P FILE				The state of the s		P. C. C. C. C. C. C. C. C. C. C. C. C. C.	GO BACK FOR NEXT FILE	END OF DATA INPUT
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COMPLETED DATA ENTRY FOR FILE: ARRAY # 1, SOURCE 17 O ADD INPUT DATA TO RUNSTREAM OR REOF TO STOP	
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GADD, P NLROAT, AISI9 COMPLETED DATA ENTRY FOR FILE: ARRAY " 1, SOURCE 19 ADD INPUT DATA TO RUNSTREAM OR GEOF TO STOP	
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♦XQT NLR.FILPROCS ADD INPUT DATA TO RUNSTREAM OR ФEGF TO STOP GADD, P NLRDAT.A3512 COMPLETED DATA ENTRY FOR FILE: ARRAY # 3, SOURCE 12 ADD INPUT DATA TO RUNSTREAM OR GEOF TO STOP

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ADD INPUT DATA TO RUNSTREAM OR PEOF TO STOP
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APPENDIX E

SIGNAL EXCESS POST PROCESSOR COMPUTER PROGRAM PACKAGE

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NLR.MAIN/SXPROC RLIB70 03/15-17:09:58-(12,) 009 C++ NAME: PASS+NLR.MAIN/SXPROC 009 C++ USAGE: @XQT PASS+NLR.SXPROC	PURPOSE: PROCESS THE PRINT FILE FROM A BMDP P3R (1981 VERS) NONLINEAR REGRESSION ANALYSIS RUN TO REARRANGE THE HOLDING TIME DATA ON THE BASIS	SIGNAL EXCESS. THE COVARIANCE MATRIX CALINEAR REGRESSION PARAMETERS IS ALSO AN OUTBIT	NS. THE BOINT FILE CODM	AS AN ELEMENT OF A FILE. THE MED PROC	MAY BE USED TO CONVERT BREAKHUINTED PRINT FILES TO ELEMENTS OF FILES.		BECAUSE FORMAT SPECS WERE EXCEEDED DURING PO	ECULION THEY SHO ANS OF THE TEXT	READ THE PRINTOUT FILE WITH THIS PROGRAM.		READIN, ELTIN	FILES:		READ		COLDOL: PRINT FILE COLDOL ON LO 6	NOTES: NOWE	PROGRAMMER/ORGANIZATION: HOFMOCKEL-JL/CSC	AND THE PROPERTY OF THE PROPERTY FOR		READ THE DATA, THEN PROCESS TO PRO-	EXCESS BINS 1.5 DB WIDE. ALSO PPOCESS	ONVERT T	IME CUVAMIANCE MAININ, PRINCOL IME DATA FOR FITHER THE STONAL FACES	CALCULATION, THE COVARIANCE, OR BOTH.	ADDITION ACCT FORDER		KEYWORDS: SIGNAL EXCESS, HOLD TIME, PROBABILITY OF		RECORD OF MODIFICATIONS: INITIAL PROGRAM 8 - 25 - 82	Z.	START EDIT PAGE
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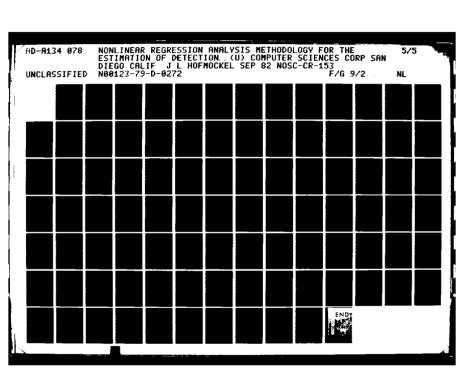
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' NOT FOUND IN FILE ', A12 )
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END
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' ASSIGN FILE ', A12,
' FAC STATUS= ', 012 )
                        ENDIF
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MICROCOPY RESOLUTION TEST CHART NATIONAL BUREAU OF STANDARDS-1963-A

	MANCE INDEX:	IAL PROGRAM 8-27-82		@ BUFTER FOR ONE LINE	A LAUTI FOR NUM CASES	@ LAUFI FOR CORR MATRIX	•	© DUMMY ARRAY SERRITION FINISH (FIND LAREL)	• UTILITY INDEX VRBL	. I MINIT OF TABLE A SECOND STREET OF TABLE OF T	PUTILITY INDEX VRBL	CASE NUMBER FROM FILE		RER OF	TO NUMBER OF VARIABLES	@ RECHESSINON PARAMETERS	& LAREL FOR PARAM EST	E' / A BOFFLICTED COACT HOLD TIME	LASEL FOR NUM PARAMS		PROPERTY EN TITE	P LABEL FOR PROBLEM TITLE	6 REGRESSION TITLE	REGR TITLE	TINE TOURS TRANSPORTER	R VRBLS	1 - PERF INDEX	OF MED 3 - CASE WEIGHT	4 - AVAIL HOLD TI	● MO 5 TO NVAR-SUBS(0 OR 1)	TABLE OR DOM WASE) & FIND PROB TITLE LA	# XFR NEXT LINE TO 0/P
APPLICABILITY: ASCII FORTRAN	KEYWORDS: REGRESSION PARAMETERS, CORRELAT HOLDING TIME, PERFORMANCE INDEX	RECORD OF MODIFICATIONS: INITIAL PROGRAM 8-27-82	WAIVERS: MONE START EDIT PAGE	CHARACTER+132 ALIN	CHARACTER 20 CLBL		*/ ASYMPTOTIC CURRELATION MAINING REAL CORR (50)	REAL DUMY (10) CHADACTED+132 FINIBL	INTEGER I	INTEGER ILAST	INTEGER K	INTEGER KASE	CHARACTER+7 LABL "	INIEGER NCAS	INTEGER NPAR	REAL P (10)	ALB	DEAL DUCK 1900	CHARACTER-22 PLBL	A / * NUMBER OF PARAMETERS */	MEAL PSIG (10) CHARACTER+80 PIII	. '	* /'PROBLEM TITLE IS'/	RTLB	* /' REGRESSION TITLE' /	REAL X (10, 200)		• •	. •		CHARACIER 25 VEBC 1101AL NUMBER OF VARIABLES'/		START EDIT PAGE	FINIBL (READ (UNIT, 10) PTIT
009 C++			• • 0 600 • • 0 600	600 600	010	0.0	600	0 0	0 0	0.0	0.0	010	010	600	600 000	600	010	0.0	010	010	5 60 00 00	010	0-0	010	010	600	010	0 0	010	0.0	0.0	O 600	600	010	010
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E-8

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P FIN NUM VRBLS LABEL AFF NUM VRBLS TO 0/P	THE LABER TO CHE TABER TO WE WAR NEAT LINE TO O/P FILLD NUM PARAMS LBL TO KER NUM PARAMS TO O/P	# FITID NUM CASES LABL # XFR NUM CASES TO O/P # FIND COKR MATRIX LBL # MOVE FWD FIVE LINES	• READ CORR MATRIX	FIND PARAM EST LBL	PARAMS.	# FIND CASES DATA # MOVE FWD TWO LINES	@ READ CASES DATA @ MOVE DATA TO 0/P	• DATA ERROR 1'. K = ', 13,	P READ MORE CASES B MOVE FWD THREE LINES
" " "	ALIN = FINLBL (UNIT, 18, RTLB) READ (UNIT, 10) RTIT ALIN = FINLBL (UNIT, 22, PLBL) DECODE (25, ALIN) NPAR FORMAT (60% 12)	ᅮ똔ᇎᇕᆠ	(T (A132) E	** ** ** ** ** ** ** ** ** ** ** ** **	- H	LABL = CAS ALIN = FJNLBL DO 100 I = 1, READ (UNIT, CONTINUE	= 1, NCA UNIT, + (DUMY(I) .EQ. KAS 1, J) =		CONTINUE IF (NVAR .GT, 5) THEN DO 130 I = 1, 3
010 010 010 20	00000000000000000000000000000000000000		009 40 009 40 009 009	09 600 600 600	000 000 000 000 010 010		000000000000000000000000000000000000000	Ξ	009 120 009 009
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			(* 1, 11AST)	THER) + DUMY (1)			J. KASF . DATA ERROR						
READ (UNIT, 30)	ILAST = NVAR - 5	READ (UNIT, +)	. (DUMY(1).	.EO. KASE)	# 1. IL	1 + 5.	CONTINUE	ELSE	WRITE (S. 110) J. KASE	ENDIF	CONTINUE	ENDIF	RETURN	ENO	
130							140				150				
600	600	600	600	010	010	010	600	010	011	600	600	600	600	600	
000170	000172	000174	000175	000176	000177	000178	000179	000180	000181	000182	000183	000184	000185	000186	1 13 673

	15-17:10:34-(12,) CHARACTER+132 FUNCTION FINIBL		UNIT, CONTRACTOR OF INPUT CONTRACTOR OF THE CONT	•	LABL • INFUT	_	NAME: PASSANLR, FINLBL	USAGE: LBL-FINLBL(UNIT. NCHR. LABL)		PURPOSE: LOCATE AND READ A STRING LABELLING	TILL DAIA IN A	LIBITATIONS: STRING RUST EXIST EXACTLY IN INPUT FILE		WARNINGS: WORKS ONLY ON N.BMDPB1 P3R (B1 VERS) PRINTOUT	SINDOCOANS DECLIDED. NONE	-	ARGUMENTS:			UNIT TO READ FROM	M			FINLBL PINLBL	3RON :S310N		PROGRAMMER/ORGANIZATION: HOFMOCKEL-JL/CSC		NPUT - READ SEQUENTIALLY	THE INDIT LABEL IS LOCATED - OUTPUT		APPLICABILITY: ASCII FORTRAN		KEYWORDS: P3R PRINTOUT FILE, LABEL, SEARCH	RECORD OF MODIFICATIONS: INITIAL PROGRAM 8-26-82		WAIVERS: NONE	START EDIT PAGE			CHARACTER & LADEL OF TIND		D WIN CO.	R UNIT	TINIBLE STATES OF THE STATES O	CONTINUE READ (UNIT. 20, PIND LABELED LINE	
		•	•	•	•			_	•							•		•					•	• •			* PRO			• •	•	•		* 1		•	IVM .	2			5 3	5 3	Z	Z	F.	3	
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* ERR = 30, END = 50) FINLBL	FORMAT (A132)		LINE = FINLBL (1:NCHR)	LABEL * ' '	LABEL = LABL (1:NCHR)	1F (LINE .NE. LABEL) GO TO 10		CONTINUE	WRITE (6, 40) LABEL	FORMAT (" READ ERROR IN FINLBL' , /,	. ' WHILE SEARCHING LABEL: ', A30)			WRITE (6, 60) LABEL	FORMAT (' PREMATURE EOF IN FINLBL' ,/.	. " WHILE SEARCHING LABEL: ", A50)	CONTINUE	RETURN	ENO	
	20							30		40			20		9		20			
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	TNPUT &	INPUI	India e	♠ OUTPUT			•	NPAR, PSIG, CORR, COVR)		NO.	MAIRIX TO A COVARIANCE MAIRIX				NONE				D NUM OF REGR EON PARAMS	P REGRPARAM ST DEVS	CORRELATION MATRIX		A COVABIANCE MATERIAL	N THE MANUAL PROPERTY OF THE P			/ORGANIZATÍON: HDFMOCKEL-JL/CSC		MULTIPLY CORRELATION MATRIX BY	COVARIANCE MATRIX - GUIPUT		FORTRAN	;	CORRELATION, COVARIANCE, MATRIX, STANDARD	AFGRESSION PARAMETERS	MODIFICATIONS: INITIAL PROGRAM 8-30-82			•	6 PARAM CORR MATRIX	COVAR		& SQ MAT COL IDX	@ TRIAG MAT IDX	S NIN OF PARAMS
SUBROUTINE GETCOV	. NPAR.	• PSIG,	• CORR.	• COVR	_	NAME: PASS+NLR. GETCOV		USAGE: CALL GETCOV (PURPOSE: CUNVERI THE	CURRELATION	LIMITATIONS: NONE	WARNINGS: NONE		SUBPROGRAMS REQUIRED:	. 9111011100		INDIT:	MPAR	PSIG	CORR	- P1-6	. 104100		NOTES: NONE		PROGRAMMER/ORGANIZATI		2	TO VIELD		APPLICABILITY: ASCII		KEYWORDS: CORRELATION	DEVIALION	RECORD OF MODIFICATIO	5	S: NO	START EDIT PAGE	REAL CORR (50)	REAL COVR (50)	ER 1	INTEGER J	×	CACIA CICATAIN
000 SUBROUTIN	000	000	000	000	000		ပံ	Ç		• • D E00	• • • • • • • • • • • • • • • • • • •		003 C++			***************************************					003 C++		5000	ن د	C	000 C++		ပံ	003 C++	ڻ د	ن ر		U		500	ڻ د	ပံ		000	000	000	005	005	005	
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				THE REPORT OF THE PROPERTY OF										The second secon					A LITTLE TO THE TABLE TO THE TA	OR EQN PARAMS	Œ							EXII			AMETERS		9-2-82				COVAR MATRIX	TAULE VEBL	5003	MAT 1DX	KARIS	PARAM LABELS	
:58-(5,) ROUTINE PRICOV (PTIII,		•	COVR • INPUT	_	E: PASS.NLR. PRTCOV	GE: CALL PRICOV (PIII, RIII, NPAR, COVR		OSE: PRINTOUT THE REGRESSI	PARAMETER COVARIANCE MATRIX	SACO SACO		NINGS: NONE		PROGRAMS REQUIRED: NUNE			(NOTICE AND THE PROPERTY OF THE	. c	COVR & COVARIANCE	ELLE DILIBILT:			ES: NOVE		GRAMMER/UNGANIZATION: MUTMUCNEL-UL/C.	ORITHM: INPUT - PRINT FORMATTED MATRIX -		LICABILITY: ASCII FORTRAN	WORDS: COVARIANCE MATRIX, REGRESSION PARAMETERS		RD OF MODIFICATIONS: INITIAL PROGRAM	VEDS: NONE	RT ED		L COVR (50) # PARN		COLUMN TO THE CO	EGER L P TRIAG	EGER NPAR	2ACTER+4 PLAB (10) @	•
** 15/0 03/13-1/:10 001 SUB 001 *	• 100	• 100	• 100	•			004 C++ USAG	:	J	ن	001 C++		ů	•	004 C** SUBP	່ວໍ	:	S	004 044	ن ر	U	001 5.4	ں ر	÷		* :	001 C++ PRUS	U	٠ ن	004 C++ APPL		• •	004 C+* RECO	ن د	,						INT	100	
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- 2,	NEW PG & TITLES				* * * * * * * * * * * * * * * * * * * *		LABEL COLS			COL 1DX LABELS			BEG COL 10X	SQ MAT ROW LOOP	END OF COLS IDX		PRT ONE ROW		RESET BEG COL				
TER+80 PTIT	WRITE (6, 10) PTIT, RTIT PORTING FORMAT ('1', //,	. ' PROBLEM TITLE 1S: './, ABO,	. /. REGRESSION TITLE 15:'.	* /, A80 /,/	. ' PARAMETER COVARIANCE MATRIX:',		WRITE (6, 20)	* (PLAB (1), 1 = 1, NPAR)	<u> </u>	•	* (1, 1 s 1, NPAR)) (110, 2x))	•	DO 50 1 = 1, NPAR	•	WRITE (6, 40) PLAB (I), I,	. (COVR (L), L . d, K)	FORMAT(1X, A4, 15, 2X, 10F12.6)	· 1+7=7	CONTINUE	RETURN	END	The second secon
000	002	003	005	003	003	200	005	100	002 20	002	100	002 30	005	200	100	001	100	003 40	100	001 50	100	100	
000056	000058 000059	090000	000001	000062	000063	000064	000065	990000	00000	00000	690000	00000	000011	000072	000073	000074	000075	920000	000077	000018	620000	080000	

END ELT.

	INPUT TO THE PARTY OF THE PARTY	IndNI	INDIV	184 TUI	OUTPUT .	OUTPUT	מטונים				, SX)	DATA FROM A	SIGNAL	TIME COABINE	IN THE DATA SET.	AND COUNT		A CONTRACT OF CONTRACTOR OF THE CONTRACTOR OF TH		The second secon						NUM REGR EON PARAMS	EQN PARAMS	VAPI			TOT 030 3910 30030 - IVI 3700	CASES DED YOT	F SIGNAL FO	EXCESS DATA				362/	BY CASE AND	TIME	TO SIGNAL EXCESS	WILL PERFORMANCE	TA PARA	EXCESS FOR A PARTICULAR
RLIB70 09/15-17:11:26-(13,) 009 SUBROUTINE GETSXD 009 • (. NPAR.	NCAS, 6		SLRD.	• ICTR.	NSX.	ay XS	NAME: DASSANIR GETSKO		NCAS, F	SLRD, ICTR. NSX	ANGE THE HOLDING TIME	PERFORMANCE INDEX BASIS TO	SS BASIS. AT THE SAME	THE DATA FOR ALL TARGETS IN	SENTIAL FOR EACH TARGE	UMBER OF CASES FO	•	LIMITATIONS: NONE	WARNINGS: NONE		SUBPROGRAMS REQUIRED: NUME	ARGUMENTS:	•	INPUT:	APAR APAR		*			9011901			e ×S	•	NOTES: NONE		PROGRAMMER/ORGANIZATION: HOFMOCKEL-JL/C>C	ALGORITHM: PASS THROUGH THE DATA CASE	PROPORTIONALLY ASSIGN	ILABLE HOLDING TIME	S BASED ON THE	USE	ESTIMATE THE SIGNAL
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A LOUP THRU CASES SAVE FRIOR VRBL INDEX CASES/SQURCE COUNT CASES/SQURCE BIAS SX +90 0B SX INDEX (POSITIV)		MIDDLE OF SX BIN SX BIN OVERLAP FRACT OUT OF BIN REMOVE SX BIAS PROCESS PORTIONS OF DATA IN THE BIN PROCESS PORTIONS OF A PRUCESS PORTIONS OF A PAUCESS PORTIONS OF A PAUCESS PORTIONS OF A A A A A A A A A A A A A A A A A A A	© END LOOP ON CASES © LOUP TO PACK SX DATA EN © ANY DATA IN LOC? © PACKED SX INDEX © LOUP THRU WDS) © FRACT HOLD TIME) © MOVE THE DATA © CLR VACATED LOC © END DATA WDS LOOP © END PACK SX LOOP
	K .LT. 1) THE RMAT ('ERROR: '. RESET K # 1 ! ' RESET K # 1 ! ' K .GT. 200) T K .GT. 200) T K .GT. 200) T K .GT. 200) T K .GT. 200 T K	MIDL = 0.75 + 1.50*FLUAT (K) DIFR = SXB - MIDL FOUT = ABS (DIFR) / 1.5 FIN = 1.0 - FDUT SX (1, K) = MIDL - 90.0 SX (3, K) = SX (3, K) + FIN*X (2, J)*X (4, J) SX (4, K) = SX (4, L) FIN*X (4, J) FF (DIFR . NE. 0.0) THEN IF (DIFR . NE. 0.0) K = K + IF (DIFR . LT. 0.0) K = K + IF (DIFR . LT. 0.0) K = K - SX (1, K) = MIDL + SX (1, K) = MIDL + SX (1, K) = MIDL +	SX (3, K) = SX (3, K) + FOUT+X (2, J) +X (4, J) SX (4, K) = SX (4, K) + FOUT+X (4, J) FOUT+X (4, J) FOUT+X (4, J) BO BO J = 1, 200 IF (SX (4, J) .NE. 0.0) THEN K = 0 DO BO J = 1, 20 IF (SX (4, J) .NE. 0.0) THEN SX (1, K) = . SX (1, K) = . SX (1, K) = . SX (1, K) = . SX (1, K) = . CONTINUE ENDIF CONTINUE ENDIF
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END ELT. 000170 000171 000172

(G,) INE PRTSXD		STIT, ST LINE OF THE PARTY OF T	3		6.	NSX,	•	E: PASS+NLR. PRTSXD		GE: CALL PRISXD (PIIT, RIIT, NPAR, P		: PRINT THE HOLDING TIME DATA 6	ON 1.5 DB SIGNAL EXCESS DATA BINS.	SNON: SNOITETIME		WARNINGS: NONE	SINDHOCOAME DEGLIEBED. WANTE	Ams attorner	ARGUMENTS:		INPOL:	T & REGRESSION	© NUM REGK PA	CIDI DECONO DIEFIDET THEY	e COUNT OF CASES PER TGT	A NUM SIG EX DATA	SX & SIGNAL EXCESS DATA	FILE DUIDUIT PRINTED FORMAT ON 10 6		ES: NONE	•	PROGRAMMEN/ORGANIZATION: MOFMOCKEL-JL/CSC	ALGORITHM: INPUT - PROCESS - PRINTOUT		APPLICABILITY: ASCII FORTRAN	EXCESS,	SOURCE LEVEL, RECUGNITION DIFFERENTIAL	CORD OF MODIFICATIONS: INITIAL PROGRAM B-30-62	TOOLS TOOLS IN THE SUCCESSION OF THE SUCCESSION	:: "	ARI EDIT PAGE	
17:11: SUBR	•	• •	• •		•			NAME:		USAGE:		PURPOSE		11811		WARNI	00013		ARGUM	2	=	,						1	•	NOTES:	6	PROCE	ALGOR		APPL.	KEYWO		RECORD	1	WAIVE	SIARI	
NLR. PRISXD RL1870 09/15-17:11:36- 002 ** CUBROUT	005	005	000	005	005	005	000	• • D 900	002 C·•	**D 900	ن ر	, _U	ပ	005 C**			002 C++			002 C++				900		S	S	**3 900	, _U		ပံ (900	ں ر		006 C++	ပ်	ပံ ပ	002 C++	ڻ ڏ	002 C.	005	
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© COUNT CASES/SOURCE © NUM OF PARAMS © NUM OF SOURCES © NUM 11EMS 1S SX DATA © REGRESSION PARAMS © PROBLEM 11TLE © REGRESSION TITLE	6 STAII DEV OF SX 6 SOURCE LVL-DET THRHLD 6 SIG EXCESS DATA	• S.D. 15 P(2) INV	e NUM SRCS F SRC LVL DATA HDR SRC LVL DATA HDR	e SX DATA HDR	
	L SDSX L SLRD (10) L SX (4, 200)	WRITE (6, 10) PTIT, RTIT FORMAT ('1' // ' PROBLEM TITLE ', 'IS:',',A80,//,' REGRESSION ', 'TITLE IS:',',A80,//, 'SIGNAL EXCESS DATA:',' /) SDSX = 1.0 / P (2)	('''' S. D. OF S. E DB' NPAR - 1 (6, 30) ('0', 2x, 'SOURCE #' RD',4x, '# OF CASES', (6, 40)	I, SLRD(I), ICTR(I), I*1,NSRC) AI (', 3X, IS, 2X, F10.2, IS) FE (6, 50) AI ('0', 5X, 'SE', 8X, 'FHI', 'HI', 8X, 'AI', /)	SX(1, 10,1)
NAN WEE	REAL Real Real	3	FORMAT FS:2, NSRC = WRITE FORMAT	FORMAT • 3X, I WRITE FORMAT • 8X, I	FOR 2
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END ELT.

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PARAMETER COVARIANCE MATRIXE	L'E MATBIVE							
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-14.25	.00465	in.	1180.8		
-12.75	.00593	4.1	693.8		
-11.25	.04333	22.9	527.4		
-9.75	.65936	27.7	466.5		
-8.25	.07442	20.6	276.8		
-6.75	.12292	6.7	54.3		
-5.25	.47803	9.6	20.0		
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-2.25	.97667	₹.	₹.		

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- (141. 119. 165. 129.	7.1.5			
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	.00060		295.0		
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	.00933	3.0	n ~		
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	LE 15	SET	3(S SOURCES)	
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•	98980.	9.0	195.4	
	0.070	8.01	20 C	
-	06180	24.	278.3	
•	10597	29.0	274.1	
-8.25	.21646	23.5	108.7	
•	.23709	23.1	97.5	
vi a	.60796	43.8	72.0	
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	.51190	30.0	58.6	
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MÉTER C	PARAMÉTER COVARÍANCE MATRIXE	PARAMETER COVARIANCE MATRIX:						
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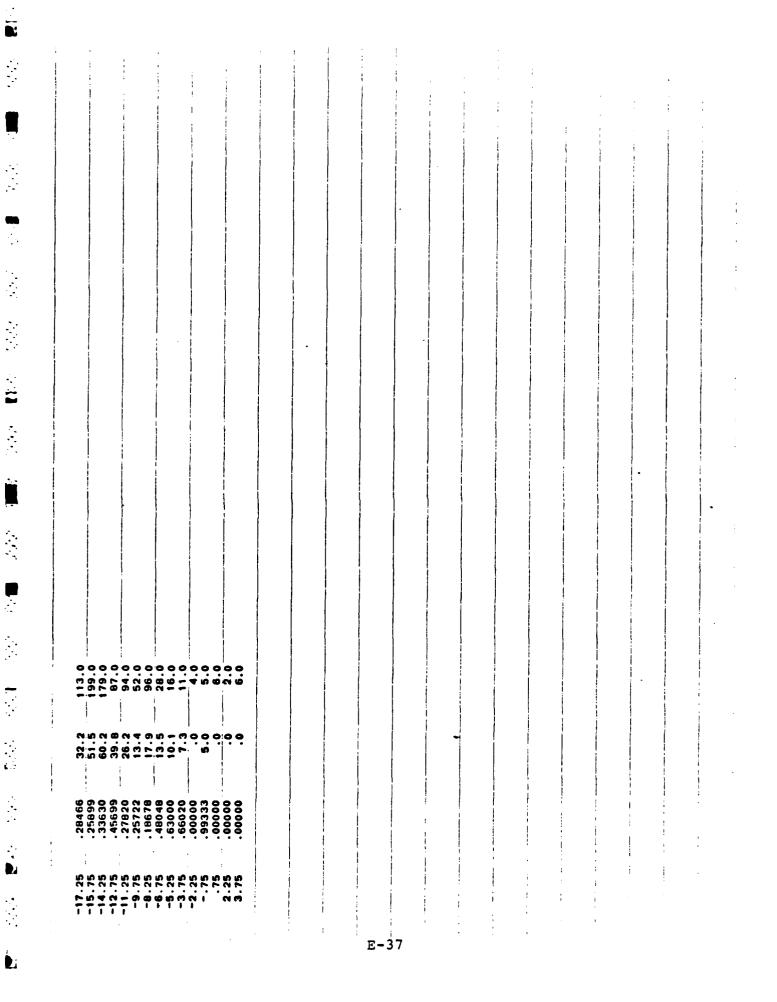
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SE FHI INT AT 158.98 13 4 164.81 14 14 14 15 15 15 15 15 15 15 15 15 15 15 15 15	N 1	159.13	12		
5	m 4	158.98 164.81	<u> </u>		
5E FHI HT A1 -29.25 .00000 .0 8.0 -27.75 .00000 .0 218.0 -24.75 .00000 .0 300.0 -21.25 .00000 .0 398.0 -18.75 .00000 .0 398.0 -17.25 .00000 .0 398.0 -17.25 .00000 .0 494.0 -14.25 .00763 8.9 1168.0 -12.75 .00495 3.3 667.0 -9.75 .05044 25.8 511.0 -9.75 .05744 18.1 234.0 -5.25 .48396 11.1 23.0	na r	158.	2 2		
SE FHI HT AI -29.25 .00000 .0 8.0 -27.75 .00067 .0 843.0 -24.75 .00067 .0 843.0 -21.75 .00067 .0 998.0 -20.25 .00000 .0 297.0 -18.75 .00000 .0 398.0 -17.25 .00000 .0 1494.0 -15.75 .00000 .0 1494.0 -15.75 .000495 3.3 667.0 -17.25 .00496 25.8 511.0 -9.75 .06478 25.9 461.0 -9.75 .0548 25.9 461.0 -9.75 .33778 3.7 11.0	9	163.	7		
-29.25 .00000 .0 218.0	SE		Ŧ		
-27.75 .00000 .0 218.0 -26.25 .00067 .6 843.0 -24.75 .00000 .0 300.0 -21.21.75 .00000 .0 297.0 -18.75 .00000 .0 297.0 -14.25 .00000 .0 698.0 -14.25 .00000 .0 698.0 -14.25 .00000 .0 1494.0 -14.25 .00000 .0 1494.0 -14.25 .00000 .0 1494.0 -14.25 .00000 .0 1494.0 -12.75 .000495 .3.3 667.0 -9.75 .06478 .25.8 511.0 -9.75 .05044 .25.8 511.0 -9.75 .05044 .25.8 511.0 -9.75 .05044 .25.8 23.4 651.0 -9.75 .05049 .25.8 23.4 651.0 -9.75 .05049 .25.8 25.8 25.10 .00000 .0 1494.	-29.25	00000	•		
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2.75 .00763 8.9 2.75 .00495 3.3 1.25 .05044 25.8 9.75 .06478 29.9 0.75 .07744 18.1 8.75 .33778 3.7	-15.75	00000	•	1494.0	
2.75 .00495 3.3 1.25 .05044 25.8 9.75 .06478 29.9 1.75 .07744 18.1 8.75 .33778 3.7 5.25 .48396 11.1	Ŧ	.00763	₽	1168.0	
1.25 .05044 25.8 9.75 .06478 29.9 8.25 .07744 18.1 18.75 .33778 3.7 5.25 .48396 11.1	•	.00495		667.0	
.25 .06478 .29.9 .25 .07744 18.1 .75 .33778 3.7 .25 .48396 11.1	-	.05044	25.8	511.0	
.25 .07744 18.1 .75 .33778 3.7 .25 .48396 11.1	5	.06478	29.9	461.0	
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.25 .48396 11.1	-6.75	.33778	3.7	O.	
.75 .97667 2.0	-5.25	.48396	•	23.0	
	-3.75	. 97667		2.0	

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PROBLEM TITLE REGRESSION ON REGRESSION TII PARAMETERS FRO	PROBLEM TITLE IS: REGRESSION ON REAL PI DATA REGRESSION TITLE IS: PARAMETERS FROM REAL DATA SET	* 2(S	SOURCES)	. 				
ARAMETER C	PARAMETER COVARIANCE MATRIX:	:XIX			:			
:	.	P2	P3	P4	P5	P6		
	1.718406	8	e	4	ហ	9		
7 7 7 7 7 7	009685 032131 .031633	.000055	.024910	.183716			•	
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HEAL DATA SET # 2 5 5 17 1 1 1 1 1 1 1 1		TITLE 1S: FROM REAL DA	SET #	6	
CE S. E. = 20.79 DB CE S. L = 20.79 DB 119.19					UNCES
SOUNCE # SL - # 20.74 DB 1 143.52		S DATA:			
51 - RO R OF CASES 143.52 17 141.99 17 155.23 20 165.23 20 165.23 20 170000 0 0 284.0 183.0	. D. OF S	Ē. = 20			
143.52 17 119.12 11 119.13 11 110.13 11 110.13		ا -	9	SES	
### ### ### ### ######################	- 0	43.	7:		
FHT HT AT	: (C)	19.	: 2 :		
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5 .00000 .0 .0 .10.0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	-68.25	00000	? •	7.0	
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000000	-56.25	00000		136.0	0
000000	-54.75	00000	•	5	
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	-41.25	.01045		275.0	•
	-39.75	00000.		112	0
	-38.25	00000		86	0
	-36.75	0000	ė.	46	0
	-33.75	00000	•	Y 6	
. 02050 1.9 94.0	-32.25	00500	•	8	,
08294 18.1 218.0 .10535 41.1 390.0 .20142 23.8 118.0 .09866 16.9 171.0 .12760 21.3 167.0 .08514 9.5 112.0	-30.75	.02050		9	
. 20142 23.8 118.0 .09866 16.9 171.0 .12760 21.3 167.0 .08514 9.5 112.0	-29.25	.08294		218	0
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	-26.25	.20142	23.8	8	0
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	120.75	, ,		- 3	
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	PARAMETER COVARIANCE MATRIX:	IX:					-
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-	1.216591	~	es	4	ĸ		
4 T T	024313 064151 .090889	.000141	.094363	.059735			
10 10	072045 051058	.000273	.025437	.023696	.032306	.077012	

	1116 13.		-			
PARAMETERS (ATA SET # 3	(5 SOURCES)			
SIGNAL EXCESS	SS DATA:					
S. D. OF S.	. E. = 9.59	90.6				
SOURCE #	St - RD	# OF CASES	Sil			
-	157.80	13				
(4)	148.90	13				
J 4 7V	150.56 150.56	5 6 6		•		
SE	FHT	Ħ	AT			
-35.25	00000	0.	5.0			
33	00000	9	52.0	•		
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. 75	00000	•	G.			
-29.25	00000	•	4			
-27.75	00000	•	310.0			
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120.00	61500.	? :	, ,			
-18.75	00000		733.0			
-17.25	.05361	14.7	274.0			
-15.75	.12214	18.8	54			
-14.25	.03687	5.5	•			
-12.75	.04267	7.0	65.0			
-11.75	P2750.	19.3	404.0			
-8.25	_ 23665	18.2	77.			
-6.75	. 20846	32.3	155.0			
-5.25	.60248		17.0			
-3.75	.60883	90.7	149.0	* ——— · · · · · · · · · · · · · · · · ·		
-2.25	.72667	50.1	0.69			
75	.30882	18.5	0.09	1		
.75	. 53150		0.69		The second secon	!
2.25	.46889	20.6	44.0			
3.75	.71858	57.5	8			
5.25	. 58716	61.1	104.0			
			7 OF 1			

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NORMAL SXPROC STOP

STOP

PBRKPT PRINTS

APPENDIX F

NONLINEAR REGRESSION PLOTS COMPUTER PROGRAM PACKAGE

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777	222	. =	53			
111	222	=	333 333			
777	2222222222	1111111	333333333			
111	2222222222	111111	333333			
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000	TTTTTTTTTT	0000000	2222222	=	88888888	22222222
	777			II	1	:
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	111	5		- -	88 88	222
	717	;		11	688888	222
	777	88	ن :		888 888	222
000 000	777	00 00		11	;	222
000 000	777		33	Ξ	ω •	222
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004 SEG MAIN
000001 003 IN PASS*NLRPLT.MAIN/NLRPLT
000002 003 IN PASS*NLRPLT.MAIN/NLRPLT
000003 004 SEG READ*, (MAIN)
000005 004 IN PASS*NLRPLT.READIN
000005 004 IN PASS*NLR.FIULBL
000007 004 IN PASS*NLR.FRADIN
000008 004 IN PASS*NLR.PRTCOV
000009 004 SEG COV*, (MAIN)
000010 003 IN PASS*NLRPLT.GETSLR
000011 007 SEG HOLD*, (MAIN)
000012 007 SEG HOLD*, (MAIN)
000014 007 SEG HOLD*, (MAIN)
000015 006 IN PASS*NLRPLT.GETPRD
000016 007 SEG PLTS*, (MAIN)
000017 007 SEG PLTS*, (MAIN)
000017 007 SEG PLTS*, (MAIN)
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000017 007 SEG PLTS*, (MAIN)

END ELT.

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SUBPROGRAMS REQUIRED: GETSLR, PRISLR, GETPRU, PRICOV, PRIALL, ELTIN READIN, FINLBL, GETPRU, GETACT, PRIALL, ELTIN
                                                                                                                                                                                                                                                                  IF PRINTOUT FILE CONTAINS ASTERISKS (****.**)
BECAUSE FORMAT SPECS WERE EXCEEDED DURING PAR
EXECUTION THEY SHOULD BE CHANGED TO 9999.99 BY
MEANS OF THE TEXT EDITOR BEFORE ATTEMPTING TO
READ THE PRINTOUT FILE WITH THIS PROGRAM.
                                                                                                                                                                                 LIMITATIONS: THE PRINT FILE FROM A P3R RUN MUST BE SAVED AS AN ELEMENT OF A FILE. THE MED PROCESSOR
                                                                                                                                                                                                               MAY BE USED TO CONVERT BREAKPOINTED PRINT
FILES TO ELEMENTS OF FILES.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      LAGELS ASSOCIATED WITH DESIRED DATA.
READ THE DATA, THEN PROCESS TO PRECESS
TO CONVERT THE CORRELATION MATRIX TO
THE COVARIANCE MATRIX, PRINTOUT THE
COVARIANCE MATRIX, PRINTOUT THE
PREDICTED FRACTIONAL HOLDING TIMES FOR
EACH SOURCE AND CONFIDENCE INTERVAL DATA
                                                                                PURPOSE: PROCESS THE PRINT FILE FROM A GMUP P3R (1981 VERS) NONLINEAR REGRESSION ANALYSIS RUN
                                                                                                               TO REARRANGED THE DATA FOR PLOTTING THE NON-
LINEAR REGRESSION EQUATION PREDICTIONS AND
THE ASSOCIATED OBSERVED DATA.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    - 27
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                                                                                                                                                                                                                                                                                                                                                                                                                                                        INPUT: PRINT FILE.ELEMS FROM P3R RUNS.
READ ON LU 8.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                COVARIANCE MATRIX
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                                               USAGE: #XQT PASS*NLRPLT.NLRPLT
              RLIB70 10/09-10:46:28-(15,)
011 C++ NAME: PASS+NLRPLT.MAIN/NLRPLT
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X END PTS, DBS DATA CROSSES
PREDICTED IND VRBL COGNOS
Y END PTS, DBS DATA CROSSES
CONF INTERVAL Y VALS
PRED DEP VRBLS COGROS
CORRELATION MATRIX(PARAMS) FLAG COVARIANCE PRI
                       COVARIANCE MATRIX (PARAMS)
                                                                                                                                                                                                                                                           REGRESSION TITLE
SRC LVL - DET THR
RUN STOP SIGNAL
LOG UNIT FOR DATA IN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              & GET COVARIANCE MATRIX
                                                                                                                                                                                                                     STAN DEV OF PARAMS
RESIDUAL MEAN SQUARE
PROBLEM TITLE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       @ PROCESS IF STATUS OK
                                   FILE ELIMENT NAME
ELEMENT CHECK FUNC
FLAG INK CALL ONCE
FILE NAME
                                                                                      FILE STATUS WD
COUNT ITEMS/SOURCE
PRI SL - RD FLAG
NUM OF CASES
SEQ NUM PLOT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                @ ASSIGN UATA IN FILE
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              SET UP FOR ELTIN
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REGR EQN VRBLS
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                                                                                                                                                                             NUM OF VRBLS
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                                                                                                                                                                                                                                                                                                                                                                                                                      NAMELIST / INPUTS/ COVAR, ELEM, FILNAM, * LEVELS, PLOTS, STOP, UNIT, VERS
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      CALL READIN (UNIT, PTIT,
RTIT, NVAR, NPAR, CORR,
NCAS, P. PSIG, X, RMSQ)
CALL GETSLR (NPAR, NCAS, P.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 CALL PRISLR ( PIIT, RIIT, NPAR, P, SLRD, ICTR )
CALL GETCOV ( NPAR, PSIG, CORR, COVR )
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                READ (5, INPUTS)
OPEN (UNIT, IOSTAT=FSTAT,
FILE=FILMAM, STATUS='OLD')
IF (FSTAT.GE. 0) THEN
IF (ELTCHK (UNIT, ELEM,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  VERS ) THEN CALE ELTIN ( UNIT, ELEM,
                        REAL COVR ( 50 )
CHARACTER+12 ELEM / ' '
                                                              LOGICAL FINK / .TRUE.
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                                                                                         INTEGER FSTAT
INTEGER ICTR ( 10 )
LOGICAL LEVELS
INTEGER NCAS
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Characier'bo Riit
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REAL CORR ( 50 )
LOGICAL COVAR
                                                                                                                                                                                                                        REAL PSIG ( 10 )
REAL RMSQ
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                                                   LOGICAL ELICHK
                                                                                                                                          INTEGER NPLT
INTEGER NSRC
INTEGER NPAR
                                                                                                                                                                                                REAL P ( 10 )
                                                                                                                                                                                                            LOGICAL PLOTS
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FORM CRUSSES THRU DATA PTS
S12E INDICATES CASE WIS
GET CONF INTERV CURVE DATA
                                                                                                                                                                                                                                CALL TO PLOT EA SRC CURVE
                                                                                                                                                                                                                                                                              . INDEX TO THE SRC OBS DATA
                                                                                                                                                                                              PRE ESET INDEX FOR XA/YA LOOP TO PLOT EA SRC SEQ PLT NUM
                                                                                                                                                 LIMIT INK CALLS TO 1
SEQ NUM OF PLOT
PLT ALL SRCS TOGETHER
                              GET PRED VALUES
GET ACTUAL OBS DATA
@ PRT COVAR IF FLAG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                     @ READ ANOTHER LIST
                                                                                                                                                                                                                                                                                                                            @ ELEM/VERS ERROR
                                                                                                                                                                                                                                                                                                                                                                                                            PILE ASG ERROR
                                                                                                    DO ALL PLOTS
NUM SOURCES
SPECIFY PEN
        CALL PRICOV ( PIIT, RIII, NPAR, COVR )
CALL GETPRD( NPAR, P, XP, YP )@
CALL GETACT( NCAS, X, XA, YA )@
                                                                             CALL GETCF! ( COVR, P, NPAR, RMSQ, NCAS, XP, YP, YC )

IF ( PLOTS ) THEN

NSRC = NPAR - 1

IF ( FINK ) CALL INK
( 'PEN 2 BLACK$' )
                                                                                                                                                                        CALL PLIALL ( RIIT, XP, YP,
                                                                                                                                                                                    NSRC, XA, YA, NCAS, NPLT
                                                                                                                                                                                                                                                                                                                                                                VERS', A12,
' NOT FOUND IN FILE ', A12
                                                                                                                                                                                                                                                                                                                                                   FORMAT ( ' ERROR: ELEM', A12,
                                                                                                                                                                                                                                                                                                                                                                                                           WRITE ( 6, 40 ) FILNAM, FSTAT FORMAT ( ' ERROR: COULD NOT', ASSIGN FILE ', A12, ' FAC STATUS* ', 012 )
                                                                                                                                                                                                                       NPLT = NPLT+ 1
CALL PLTONE ( RTIT, XP,
                                                                                                                                                                                                                                                                                                                             WRITE ( 6, 30 ) ELEM, VERS,
                                                                                                                                                                                                                                            YP(1,1), XA(1,1A),
YA(1,1A), ICTR(1),
                                                                                                                                                                                                                                                                                                                                                                                                                                                         ENDIF
1F ( .NOT. STOP ) GO TO 10
CLOSE ( UNIT )
STOP ' NORMAL NLRPLT STOP '
END
                                                                                                                                                                                                                                                                               1A = 1CTR(1) + 1A
                                                                                                                                                                                                            DO 20 I = 1, NSRC
                                                                                                                                                               NPLT = NPLT +
                                                                                                                                                   FINK . FALSE
                                                                                                                                                                                                                                                                      YC(1,1,1
IF ( COVAR )
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END ELT.

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								OUTPUT	104100				PIII, RIII, NVAR,	NCAS, F. FSIG. A.	ATA FROM A P3R(81 VEKS)			R RUN PER PRINTUUT FIL	IF CONTAINS ASTERISKS	SPECS WERE EXCEEDED O	SHOULD BE CHANGED TO 9999.99 BY	EDITOR BEFORE A	FILE WITH THIS	NEBL				1001001 @				A RECKESSION TITLE			P RECR EUN	STAN	S SECRECA					HOFMOCKEL/CSC			ED DATA - OUTPUI
NLRPLT.READIN RL1B70 10/09-10:46:15-(9,) OOS SUBROUTINE READIN	· UNIT,	, print,		NOW.	• CORR.	• NCAS.	•	• PSIG,	× 3300)	NAME: PASS+NLR. READIN		USAGE: CALL READIN (UNIT.		PURPOSE: READ SELECTED DATA FROM			LIMITATIONS: ONLY ONE P3R RUN PER PRINTOUT FILE	SELECTION OF THE PROTOCOL OF THE CONTRACTOR		EXECUTION THEY	MEANS OF THE T	READ THE PRINTOUT	SUBPROGRAMS REQUIRED: FINLBL	•	ARGUMENTS:		: IO481		OUTPUT:	7114	RILL	CORR	NCAS	a	PSIG	×	PHOL		NOTES: NOME		PROGRAMMER/ORGANIZATION: HOFMOCKEL/CSC		ALGORITHM: INPUT - SEARC	READ ASSOCIATED DATA
NLRPLT.READIN RLIB70 10/09-1 005	002	500	e 600	002	005	900	900	900	900	000	002 C+	005 C++	• •	000					005				005 00					**************************************				005 C++			005 C++				* • · · · · · · · · · · · · · · · · · ·						005 C++
PELT.L DO00001	00000	000004	50000	00000	B00000	600000	000010	000011	000012	510000	0000	910000	000017	0000	000050	000021	000022	000023	000024		7 000027	000028	000029	000031	000032	000033	000034	000035	000037	000038	000039	000040	000042	000043	000044	000045	000046	2+0000	81:0000	00000	000051	000052	000053	000054	000055

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		CORRELATION MATRIX, CASE DATA	E INDEX		ROGRAM 8+27-82				& BUFFER FOR ONE LINE	O LABEL FUR MUM CASES		G LAUEL FUR CORR MATRIX	Cobbellation	CONTRACTOR MAININ		O UTILITY INDEX VRBL	D I LIMIT		OTILITY INDEX VRBL	CASE NUMBER		S UIL CHAR VRBL	S NUMBER OF CASES MINISTR OF DADAMATEDS		ഹ	& LABEL FUR PARAM EST	į	@ LAUEL FUR NUM PARAMS	100	e ST DEV OF PARAMETERS • PROBLEM TITLE	& LABEL FUR PROBLEM TITLE		A DECEMBER SQUARE	S RECKESSION LINES	1	DAIA	REGR VP	SE WOLL FIRM INDEX	WD 3 - CASE WEIGHT	MD 4 -	2	@ LABEL FOR NUM VRBLS				IND PROB TITLE	A XFR NEXT LINE TO O/P
APPLICABILITY: ASCII FORTRAN		RAMETERS.	HOLDING TIME, PERFORMANCE INDEX		RECORD OF MODIFICATIONS: INITIAL PROGRAM 8-27-82	anon	START FOLT PAGE		CHARACTER+132 ALIN	CLBL		CHARACTER*29 COLB	≌.	MEAL CURM (50)			INTEGER ILAST			INTEGER MASE	INTEGER L	CHARACTER*7 LABL	INTEGER NCAS			. <u>5</u>	+ / 'PARAMETER ESTIMATE' /			REAL PSIG (10) CHARACTER:BO PT1T	CHARACTER+16 PTLB	. /'PROBLEM fITLE 1S'/		CHARACTER 180 R111	· ·	INTEGER UNIT	REAL X (10, 200)	• •	• •	•	•		* / ICIAL NUMBER OF VARIABLES"	START EDIT PAGE		FINIBL	READ (UNIT, 10) PTIT FORMAT (A80)
005 C++	**> 500	-				2000		000	000	900	900	500	500	000	500	000	500	900	002	500	005	005	200	000	000	900	900	005	900	000	005	900	005	000 004	000	900	005	000 900	200	002	900	9005	000		005 C	900	005 005 10
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P FIND NUM CASES LABL
F XFR NUM CASES TO O/P
P FIND CORR MATRIX LBL
P MOVE FWD FIVE LINES
                       @ FIN NUM VRBLS LABEL & XFR NUM VRBLS TO 0/P
                                                                                                                                                                                                                                                    READ PARAMS, ST DEVS
                                                                                                                                                                                                                  # FIND PARAM EST LBL MOVE FWD TWO LINES
                                                                                                                                                                                                                                                                                                       @ FIND CASES DATA @ MOVE FWD TWO LINES
                                                                                                                                                                                                  @ READ RESID MEAN SQ
                                                                                                                                                                                                                                                                                                                                                                         @ MOVE DATA TO 0/P
                                                                                                                                        * READ CORR MATRIX
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        READ MORE CASES
                                                                                                                                                                                                                                                                                                                                                 READ CASES DATA
                                                                                                                                                       @ INTO O/P ARRAY
                                                                                                                                                                                                                                                                                                                                                                                                                                      @ DATA ERHOR
                                                                                                                                                                                                                                                                                                                                                                                                                                                     IN READIN', /, ' FILE READ INDEX = ',13, ' CASE NO. * ', 13)
                                                                                                                                                                                                                                                                                                                                                                                                                                              CASE INDEX MISMATCH'
                                                                    CLBL )
                                                                                                                                                                                                           FORMAT ( 20%, E25.10 )
ALIN = FINLBL ( UNIT, 24, PALB )
  FINLBL ( UNIT, 25, VLBL )
                                           PLBL )
                                                                                      COLB
                                                                                                                                                                                                                                                                                                                                                                   KASE, ( DUMY(I), I = 1, ILAST
IF ( J .EQ. KASE ) THEN
                                                                                                                                                                                                                                                                                                       ALIN = FINLBL ( UNIT, 7. LABL )
                                                                                                                                                                                                                                                                              FORMAT ( 8X, 2( 1X, F16.6 ) )
                                                                                                                                                                 ( ¥ '7 *
                                                                                                                                                                                                                                                                                                                                                                                                                                      110 ) J. KASE
ALIN = FINLBL ( UNIT, 25, VL
DECODE ( 20, ALIN ) NVAR
FORMAT ( 48x, 17 )
ALIN = FINLBL ( UNIT, 18, RT
READ ( UNIT, 10 ) RTIT
ALIN = FINLBL ( UNIT, 22, PL
DECODE ( 25, ALIN ) NPAR
FORMAT ( 50x, 17 )
ALIN = FINLBL ( UNIT, 20, CL
DECODE ( 20, ALIN ) NCAS
                                                                          DECODE ( 20, ALIN ) NCAS
ALIN = FINLBL ( UNIT, 29, CI
DO 40 I = 1, 5
REAC ( UNIT, 30 ) ALIN
FORMAT ( A132 )
                                                                                                                                                                                                                                                                                                                                        ILAST = MIN ( 8, NVAR+3 )
DO 120 J = 1, NCAS
                                                                                                                                                                         FORMAT ( 12x, 11F12.4 )
                                                                                                                                                                                                                                                                                                                        READ ( UNIT, 30 ) ALIN
                                                                                                                                                                                                                                   READ ( UNIT, 30 ) ALIN
                                                                                                                                                                                                                                                                                                                                                                                                   * DUMY (
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        IF ( NVAR .GT. 5 ) THEN
                                                                                                                                                                                                  READ ( UNIT, 65 ) RMSQ
                                                                                                                                                                                                                                                             r, 80 )
), PSIG
                                                                                                                                                         READ ( UNIT, 50 )
                                                                                                                                        DO 60 I = 1, NPAR
                                                                                                                                                                                                                                                    DO 90 1 = 1, NPAR
                                                                                                                                                                                                                                                                                              CASE'
                                                                                                                                                                                                                                                                                                                 DO 100 I = 1, 2
                                                                                                                                                                                                                                                                                                                                                                                                                                     WRITE ( 6.
                                                                                                                                                                                                                                                              READ ( UNIT
                                                                                                                                                                                                                                                                                                                                                                                                                                               FORMAT (
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                                                                                                                                                                 ( CORR (
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LABL = 1
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Land to the second second

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• MOVE FWD THREE LINES
                                                                WRITE ( 6, 110 ) J, KASE • DATA ERROR
DO 130 1 = 1, 3

READ ( UNIT, 30 )

CONTINUE

ILAST = NVAR - 5

DO 150 J = 1, NCAS

READ ( UNIT, + )

KASE, ( DUMY(I),

IF ( J .EQ. KASE )

DO 140 I = 1, ILA
                                                X ( I + CONTINUE ELSE
                                                                                 CONTINUE
ENDIF
RETURN
END
 END ELT.
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LOGICAL UNIT TO READ FROM NUM CHARS IN LABEL INPUT LABEL TO SEARCH FOR
                                                                                                                                                                                                                                                                                                   @ LINE CONTAINING THE LABEL
                                                                                                                                                                           WARNINGS: WORKS ONLY ON N+BMDPB1 P3R ( B1 VERS ) PRINTOUT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      © INPUT ARG LABEL
© LINE TO MATCH
© NUM CHAKS IN LABEL
© LOGICAL UNIT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    @ FIND LARELED LINE
                                                                                                                                                      LIMITATIONS: STRING MUST EXIST EXACTLY IN INPUT FILE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              LABEL TO FIND
                                                                                                                                                                                                                                                                                                                                                                ALGORITHM: INPUT - READ SEQUENTIALLY THROUGH FILE FROM CURRENT LINE UNTIL A MATCH FOR THE INPUT LABEL IS LOCATED - OUTPUT
                                                                                                                                                                                                                                                                                                                                                                                                                                                  RECORD OF MODIFICATIONS: INITIAL PROGRAM 8-26-82
                                                                                                                        PURPOSE: LOCATE AND READ A STRING LABELLING
SPECIFIC DATA IN A PRINTOUT FILE
                                       INPUT
INPUT
TOPUT
                                                                                                                                                                                                                                                                                                                                                                                                                             KEYWORDS: P3R PRINTOUT FILE, LABEL, SEARCH
                                                                                                                                                                                                                                                                                                                                             PROGRAMMER/ORGANIZATION: HOFMOCKEL-JL/CSC
                                                                                                     USAGE: LBL=FINLBL( UNIT, NCHR, LABL )
         RLIB70 10/09-10:47:41-(12,)
009 CHARACTER+132 FUNCTION FINLBL
                                                                                                                                                                                                                                                                                                                                                                                                        APPLICABILITY: ASCII FORTRAN
                                                                                                                                                                                                SUBPROGRAMS REQUIRED: NONE
                                                                                NAME: PASS+NLR.FINLBL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             CHARACTER+30 LABEL
CHARACTER+30 LABL
CHARACTER+30 LINE
INTEGER NCHR
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      READ ( UNIT, 20,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                               START EDIT PAGE
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LABL
                                                   NCHR.
                                         UNIT.
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                                                               LABL
                                                                                                                                                                                                                                                                                                                          NOTES: NONE
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NUM OF REGR EON PARAMS
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CORRELATION MATRIX
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P SQ MAT FOW IDX
P SQ MAT COL IDX
P TRIAG MAT IDX
P NUM OF FARAMS
                                                                                                                                                                                                                                                                @ COVARIANCE MATRIX
                                                                                                                                                                                                                                                                                                                                                                                                                                            PARAM CORR MATRIX
                                                                                                                                                                                                                                                                                                                                                                     KEYWORDS: CORRELATION, COVARIANCE, MATRIX, STANDARD DEVIATION, REGRESSION PARAMETERS
                                                                                                            PURPOSE: CONVERT THE REGRESSION EQUATION PARAMETER CORRELATION MATRIX TO A COVARIANCE MATRIX
                                                                                                                                                                                                                                                                                                                   ALGORITHM: INPUT - MULTIPLY CORRELATION MATRIX BY DIAGONAL STANDARD DEVIATION MATRIX TO YIELD COVARIANCE MATRIX - OUTPUT
                                                                                                                                                                                                                                                                                                                                                                                                RECORD OF MODIFICATIONS: INITIAL PROGRAM 8-30-82
                                                                                             USAGE: CALL GETCOV ( NPAR, PSIG, CORR, COVR )
                                       INPUT
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                               O INFUT
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                                                                                                                                                                          SUBPROGRAMS REQUIRED: NONE
                                                                             NAME: PASS+NLR. GETCOV
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             INTEGER K
Integer Npar
Real Psig ( 10 )
      ELTOT7 RL1870 10/09-10:48:07-(4,)
000001 000 SUBROUTINE GETCOV
                                                                                                                                        LIMITATIONS: NONE
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REAL COVR ( 50
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CORR
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PSIG.
CORR.
                                                           COVR
                                                                                                                                                                                                                                                                                  NOTES: NONE
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REGRESSION TITLE
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COVARIANCE MATRIX
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END OF COLS
TRIAG MAT IDX
NUM PARAMS
                                                                                                                                                                                                                                                                                                                                                            KEYWORDS: COVARIANCE MATRIX, REGRESSION PARAMETERS
                                                                                                                                                                                                                    PROBLEM TITLE
                                                                                                                                                                                                                                                                                                                           ALGORITHM: INPUT - PRINT FORMATIED MATRIX - EXIT
                                                                                                                                                                                                                                                                                                                                                                              RECORD OF MODIFICATIONS: INITIAL PROGRAM 9-5-82
                                                                                              USAGE: CALL PRICOV ( PIIT, RIII, NPAR, COVR )
                                         IN PUT
                                                                                                              PURPOSE: PRINTOUT THE REGRESSION EQUATION PURPOSE: PARAMETER COVARIANCE MATRIX
                                                                                                                                                                                                                                                                                                          PROGRAMMER/ORGANIZATION: HOFMOCKEL-JL/CSC
                                                                                                                                                                                                                                                                       9
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                                                                                                                                                                                                                                                                                                                                                                                                                                               INTEGER K
INTEGER L
INTEGER L
INTEGER NPAR
CHARACTER+4 PLAB ( 10 )
*/Pl', P2', P3', P4', P5',
* P6', P7', P8', P9', P10'/
                                                                                                                                                                                                                                                                                                                                           APPLICABILITY: ASCII FORTRAN
                                                                                                                                                                           SUBPROGRAMS REQUIRED: NONE
                                                                             NAME: PASS+NLR. PRTCOV
NLR.PRTCOV
RLIB70 10/09-10:47:58-(6,)
002 SUBROUTINE PRTCOV
                                                                                                                                         LIMITATIONS: NONE
                                                                                                                                                                                                                                                                                                                                                                                                                        REAL COVR ( 50 )
                                                                                                                                                                                                                                                                                                                                                                                                      START EDIT PAGE
                                                                                                                                                                                                                                                               FILE OUTPUT:
                                                                                                                                                                                                                             RTIT
NPAR
COVR
                                                                                                                                                         WARNINGS: NONE
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PRUBLEM TITLE PREGRESSION TITLE PARM PG & TITLES	@ LABEL COLS	• COL IDX LABELS	P BEG COL IDX P SQ MAT HOW LOOP P END OF COLS IDX	RESET BEG COL
CHARACTER 80 PTIT CHARACTER 80 RTIT WRITE (6, 10) PTIT, RTIT FORMAT ('1', //, * 'PROBLEM TITLE IS:', A80, * /, REGRESSION TITLE IS:', * /, A80 //, * 'PARAMETER COVARIANCE MATRIX:	(6, 20) (B (1), I = 1,	FORMAI (12x, 10(Bx, A4) ,/) WRITE (6, 30) (I, I = 1, NPAR) FORMAI (/, 12x, 10 (110, 2x)	J = 1 DO 50 1 = 1, NPAR K = J + 1 - 1 WRITE (6, 40) PLAB (I), 1,	FORMAT(1X, A4, 15, 2X, 10F12.5) J = J + I CONTINUE RETURN END
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000056 000057 000059 000060 000061 000063	000065	000000 0000000 0000000	000072 000073 000074	000077 000078 000079 000009

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•ELT•	FILE: NL	NLRPLT	*** GETSLR ***	DATE 100782 P	PAGE 1
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000003	000	NAME			
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900000	000	*	INLAI		
000000	000	* SLRD.	e ou Pul		
800000	000	+ ICTR	€ OUTPUT		
60000	000	NAME: DAG CAMING	, , , , , , , , , , , , , , , , , , ,		
0000		. MANE FASS MENT LI.			
000012		USAGE: CALL GETSLR	Z		
000013			SLRO, ICIR.)		
000014	000 C**		•		
000015		PURPOSE: CALCULATE SOURCE	SOURCE LEVEL LESS RECOGNITION		
910000	Ç	DIFFEREN			
210000		THE NUMBER OF	ER OF CASES FOR EACH TANGET.		
810000		FALTATIONS: NONE			
000050					
000021	**D 000	WARNINGS: NONE			
000022	000 C+				
000023	000 C • •	SUBPROGRAMS REQUIRED:	RED: NONE		
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000025	_	ARGUMENTS:			
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000034	000 C++	OUTPUT:			
000035	000 C++	SLRD		DIFF PER 1GT	
000036		ICTR	& COUNT OF CASES PER TGT	ER 161	
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850000	000	NOTES: NONE			
000040	ט כ	PROGRAMMER/ORGANIZATION:	ZATION: HOFMOCKEL-JL/CSC		
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000042	•• > 000	ALGORITHM: ESTIMATE THE	IE THE STANDARD DEVIATION OF		
000043	++3 000 T	- 1	SNAL EXCESS AND THE SOURCE		!
000044	000 C++	revers			
000045		USING THE	THE REGRESSION EQUATION PAHAMETERS.		
000046	y (PASS THROUGH	AROUGH THE DATA AND COUNT THE		
000047	, ر	NOMBER OF	UP CASES FUR EACH SUUMEE.		
000048	000				
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000051	ے ر				
000052	ט כ	MEYWORDS: SOURCE L	LEVELS. RECOGNITION DIFFERENTIALS		
000053	000 C.				
000054	S	RECORD OF MODIFICATIONS:	NTIONS: INITIAL PROGRAM 9-27-82		
000025	• • O O O O		•		

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13.55 P.35

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000026	••0 000	WAIVERS: NONE					
000057	000 003 C	START EDIT PAGE					
650000	000	INTEGER 1		● UTIL INDEX VRBL			
090000	000	INTEGER ICTR (10)		e COUNT OF CASES/SOURCE			
190000	-000	INTEGER 1X		@ 1CTP 14UEX INCR			
000062	000	INTEGER J		& UTIL TRUEX VABL			
000003	000	INTEGER NCAS		O NUSSILE OF CASES	•		
000064	000	INTEGER NPAR		& NUT ! ARAMS			
000005	000	INTEGER NSRC		P NUM OF SOURCES			
990000	000	REAL P (10)		& RECRESSION PARAMS			
000067	.000	REAL SLRD (10)		SRC. LVL - DET IHR			
B90000	000	REAL X (10, 200)		P VRILS VS PI			
690000	000	REAL XIPR		& SAVE PRIOR VRBL			
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000001	000	START EDIT PAGE					
000072	၁ 000						
000073	000	NSRC = NPAR = 1		P NUTIFER SOURCES			Ì
000074	000	SLRD (1) = - P (1)	/P(2)	& 1ST SRC SL-RD			
220000	000						
920000	000	DO 10.1 = 2. NSRC		P SRCS 2 THRU N			
000077	000	SLRD (1) = SLRD (1	<u>-</u>				
000078	000) d / (l + l) d -	(7)	O COMBINE 1ST, NTH SRCS			
620000	000	ICIR (1.) * 0					
080000	000 10	CONTINUE		•			
000081	000	XIPR = 0.0		O PRESET PRIOR VRBL SAV			
000082	000						† †
. 680000	000	1X = 4					
000084	000	DG 20 J = 1, NCAS		& LOUP THIN CASES	-		
000085	000	IF (X(I+IX, J.) NE.	-XIPR JIHEN	EN			-
980000	000	XIPR = 1.0		● SAVF PRIOR VRBL		•	
000087	000	1 + 2 + 1		@ INDEX CASES/SOURCE			
880000	000	IF (-1.602) IX	r 3				
680000	000	ENDIF					
060000	000	ICTR (I) = ICTR (I	- + - 1	€ COURT CASES/SOURCE			
160000	000 30	CONT INUE		@ END LODP ON CASES			!
00000	000	RETURN					
00003	000	END.					

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000012	000	USAGE:	CALL PRISLR (RTIT, NPAR, I'		
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000052	- 000	- INTEGER	ER ICTR (10)		 	-
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000 C 000 10 FORMAT (1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,) PT			
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000 10 FDRMAT (1) 000 10 FDRMAT (1) 000	// - 1 // - 1 // - 1 // - 1 // - 1 // - 1			
000 10 15: 1, A A O O O O O O O O O O O O O O O O O	// . PROBLEM TITLE // . REGRESSION // //			
000 + 15:','AE 000 + 111LE 19 000 000 SDSX = 1.0 000 20 FORMAT (''' 000 000 PSC = NPAF 000 WRITE (6, NPAF 00	//, REGRESSION ', ', A80, /', LEVELS DATA: ', '			
000 + 1111E 15 000 SDSX = 1.0 000 WRITE (6, 000 29 FDRMAT (''' 000 WRITE (-6, 000 30 FORMAT (''C 000 30 FORMAT ('C 000 30 FORMAT ('C 000 30 FORMAT ('C 000 30 FORMAT ('C 000 30 FORMAT ('C 000 30 FORMAT ('C 000 30 FORMAT ('C 000 4 SL RD	./, A80, //. LEVELS DATA:: , / / / P (2)			
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000 SDSX = 1.0 000 WRITE (6, 000 20 FS.2, ' DE 000 NSRC = NPAR 000 30 FORMAT ('C 000 30				
000 20 F5.2, 1 DE 000 000 000 000 000 000 000 000 000		@ S.D. 1S P(2) INV		
000 20 FORMAT (''' 000 WSRC = NPAR 000 WSRT = (-6, 000 30 FORMAT (''C) 000 WRITE (-6, 000 000 WRITE (-6, 000 000 000 WRITE (-6, 000 000 000 000 000 000 000 000 000 0) SDSX			
000 • F5.2, ' DE 000 NSRC = NPAF 000 30 FORMAT ('C 000 30 FORMAT ('C 000 • 'SL - RD' 000 • 'SL - RD' 000 • 'SL - RD' 000 • 'SL - RD'	1 S. 0, 0f. S. E			
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000 000		A SRC LVL DATA HDR		
* 0000	2X, 'SOURCE #', 4X.			
0000	(, '# OF CASES', /)			
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2000	. ICTR(1), 1=1,NSRC			
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♦ CRUSS LEG X INC

• CRUSS LEG Y INC

• INDEX VRBL

• NUM CASES(DATA PTS)
                                                                                                                                                                                                                                                                       . & NUM CASES (DATA PTS)
. @ REGR EQN VRBLS
                                                                                                                                                                                                                                                                                                                                                                                     ALGORITHM: INPUT ACTUAL OBSERVED DATA POINTS AND THE CASE WEIGHTS ASSOCIATED WITH THEM. CALCULATE THE END POINTS OF CROSSES WHICH MARK THE DATA POINTS AND INDICATE THE WEIGHT OF THE CASE BY MAKING THE SIZE OF THE CROSS PROPORTIONAL TO THE SQUARE ROOT OF THE CASE WEIGHT.
                                                                                                                                                                                                                                                                                                                        @ IND VRBL (END PTS)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            KEYWORDS: CASE WEIGHTS, OBSERVED DATA, REGRESSION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   RECORD OF MODIFICATIONS: INITIAL PROGRAM 9-27-82
                                                                                                                                            PURPOSE: CALCULATE THE END POINT VALUES FOR THE CROSSES WHICH MARK THE ACTUAL DATA ON THE NONLINEAR REGRESSION PLOTS.
                                                         INPUT
OUTPUT
OUTPUT
                                                                                                                                                                                                                                                                                                                                                                  PROGRAMMER/ORGANIZATION: HOFMOCKEL-JL/CSC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                        APPLICABILITY: ASCII FORTRAN
                                                                                                                                                                                                                               SUBPROGRAMS REQUIRED: SQRT
                                                                                                    NAME: PASS+NLRPLT.GETACT
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NLRPLT.GETACT
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Subroutine Getact
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INTEGER NCAS
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MAXIMUM CASEWT	REGR EON VRBLS	MULI VRBL FOR END PT CALC	03S 14D VRBL DATA X'S	OBS DEP VRBL DATA X'S		INITIALIZE MAXWI	LOGP TO FIND MAX WT	SAVE LAKG'ST VAL	END CASES LOOP	X MULT FOR CROSS LEGS	LOOP THRU CASES	X INC DATA PT TO END PT	LIMIT DELX > .01	Y INC DATA PT TO END PT	FILL END PTS OF CROSSES					•			END CASES LOOP			
REAL MAXWT	X (10, 200)	SX NX	XA (4,	REAL YA (4, 200)		•	•	= AMAX1 (MAXWT, X(3,1)) @	CONTINUE	XM = 2.50/SQRT (MAXWT)	DO 20 1 = 1, NCAS	DELX = XM + SQRT (X(3,1))	= AMAX	DELY = DELX , 37.9	XA (1, 1) = X (1, 1) - DELX 0	YA (1, 1) = X (2, 1) - DELY	XA (2, 1) = X (1, 1) + DELX	YA (2, 1) = X (2, 1) + DELY	XA (3, 1) = XA (1, 1)	YA (3, 1) = YA (2, 1)	XA (4, 1) = XA (2, 1)	YA (4, 1) = YA (1, 1)	CONTINUE	RETURN	END	
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OUTPUT
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                                                                                                                     PURPOSE: FORM THE PREDICTED VALUES FOR THE REGRESSION EQUATION BASED ON A NONLINEAR RECRESSION USING THE COMPLEMENT OF THE CUMULATIVE
                                                                                                                                                                                                                                                                                                                                              ALGORITHM: INPUT PARAMETERS - EVALUATE THE CITA GAUSS, THEN COMPLEMENT ( 1.0 - A ), THE EFFECTS OF MULTIPLE SOURCES ARE ADDED IN AS THE DUMNY VARIABLES ASCOCIATED WITH PARAMS
                                                                                                                                                                                                                                                                                                                                                                                                                      KEYWORDS: PREDICTION, REGRESSION, GAUSSIAN, HOLD TIME
                                                                                                                                                                                                                                                                                    VALUS
VALUS
                                                                                                                                                                                                                                       @ NUM PARAMS
@ REG EQN PARAMS
                                                                                                                                                                                                                                                                                                                                                                                                                                       RECORD OF MUDIFICATIONS: INITIAL PROGRAM 9-27-82
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          O INDEX VEBLO INDEX VEBLO NUM PARAMS
                                                                                                                                                                                                                                                                                   @ IND VRBL
@ DEP VRBL
                                                                                                                                                                                                     SUBPROGRAMS REQUIRED: MDNOR ( IMSL-8 LIB )
                                                                                                                                                                                                                                                                                                                               PROGRAMMER/ORGANIZATION: HOFMOCKEL-JL/CSC
                                                                                                       USAGE: CALL GETPRD ( NPAR, P, XP, YP )
                                                                                                                                                                                                                                                                                                                                                                                                    APPLICABILITY: ASCII FORTRAN
                                                                                                                                                                                                                                                                                                                                                                                   P(3) ... P(NPAR).
                                                                                    NAME: PASS+NLRPLT.GETPRD
                                          NPAR
                                                                                                                                                                                                                                                                  INPUT/OUTPUT: NONE
NLRPLT.GETPRD
RLIB70 10/09-10:47:03-(5,)
Subroutine Getprd
                                                                                                                                                                   LIMITATIONS: NONE
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START EDIT PAGE
                                                                                                                                                 GAUSSIAN.
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Integer J
Integer NPAR
                                                                                                                                                                                     WARNINGS: NONE
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6 NUM OF SOURCES	THE PRED THUP VRBL VALS	● STAT VALUE	THE SHOULD WIN &	136 C37 200 W	• FILL INDP VRBI			& LOUP ON SOURCES	COOP INDP VRBL VALS	JO BASIC STAT	& DUMY VRIL EFFECTS	@ Y-INTERCEPT ADDED		P AREA UNDER GAUSSIAN	& CPL GAUSSIAN	END IND VRB LOOP	P END SOURCES LOOP			
INTEGER NSAC REAL P (10)	REAL XP (61) REAL YP (61. 10)	REAL 2	1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		- 01	XP (1) = XP (I - 1) + 1.0	CONTINUE	DO 30 J = 1, NSRC	00 20 1 * 1, 61	Z = P (1) + P (2) + XP (1	IF (J.GT. 1) THEN	2 = 2 + P (3 + 1)	ENDIF	CALL MDNOR (Z, A)	YP (1, U) # 1.0 - A	CONTINUE	CONTINUE	RETURN	END	
000	00 0 00 1		001 0	000	004	004	004 10	004	004	900	005	003	001	100	00	004 20	004 30	100	100	
000056	000058 000059	090000	000061	000003	000064	000065	990000	000067	890000	690000	00000	000071	000072	000013	000074	000015	920000	0000077	000018	END ELT.

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INPUT, FARAMS OF REGNEON (COEF)
INPUT, NUM OF PARAMS
INPUT, KESID MEAN SQUARE
INPUT, NUM OF OBS DATA PTS
INPUT, FRED INDP VRBL
INPUT, FRED DEP VRBL
                                                                                                                                                                                                                                                                                                                        INPUT, COVARIANCE MATRIX (PARAMS)
                                                                                                                                                                                                                                                                                                                                                                                                                          @ DUTPUT, CONF LIMITS, YP
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       AND THE PARAMETERS ALONG WITH THE PREDICTED VALUES OF THE REGRESSION CURVE. GET THE CRITICAL T VALUE FROM MDSTI USING DEG OF FREEDOM EQUAL TO NCAS-NPAR. CUNSTRUCT THE VECTOR MADE UP OF THE FIRST PARTIAL DERIVATIVES
                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ALGORITHM: INPUT THE COVARIANCE MATRIX FOR THE PARAMETERS
                                                                                                                                                                                                                    LIMITATIONS: THE COVARIANCE MATRIX OF THE PARAMETERS IS REQUIRED AS WELL AS THE PREDICTED VALUES FROM THE REGRESSION.
                                                                                                                                                                        PURPOSE: CONSTRUCT THE CONFIDENCE INTERVALS ABOUT THE PREDICTED VALUES OBTAINED FROM
                                                                                                                                                                                                                                                                            ( N*AIMSL LIB )
                                                                                                INPUT
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TO FO
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                                                                                                                                                                                          A NONLINEAR REGRESSION USING THE UCLA BMDP P3R PROGRAM.
                                                                                                                                              CALL GETCFI ( COVR, P, NPAR, RMSQ,
NCAS, XP, YP, YC )
                                                                                                                                                                                                                                                                            SUBPROGRAMS REQUIRED: MDSTI
                                                                                        × × ×
                                                             NPAR,
                                                                      RMSQ.
                                            COVR,
                                                    Q.
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                                                                                                                             NAME: PASS+NLRPLT.CFI
NLRPLT.GETCFI
RLIB70 10/09-10:46:43-(12,)
SUBROUTINE GETCFI
                                                                                                                                                                                                                                                          WARNINGS: NONE
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NCAS
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DEG OF TREEDOM
1ST PARTIAL DERIV OF DEP W/R PAR
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                                                                                                                                                                                                                                   CONFIDENCE LEVEL
COVARIANCE MATRIX(PARAMS)
                                                                                                                                                                                                                                                                                                                                                                                                                        CRITICAL VAL STUDENT'S T
                                                                                                                                                                                                                                                                                                                                                                                                                                                        • CONF INTERVAL Y VALS
• + OR - CHG FOR CONF INT
• PRED DEP VRBLS COORDS
• Z STATISTIC
OF THE NONLINEAR PREDICTION FUNCTION WITH RESPECT TO THE PARAMETERS. PRE AND POST MULTIPLY THE COVARIANCE MATRIX BY THE VECTOR IN ROW AND COLUMN FORMAT. FORM THE HALF CONFIDENCE INTERVAL AS THE CRITICAL I VALUE TIMES THE SQRT OF THE RESIDUAL MEAN SQUARE TIMES THE MATRIX MULTIPLICATION RESULT. OUTPUT THE Y COORDS OF THE BOUNDING CURVE FOR THE CONFIDENCE
                                                                                                                                                                                                                                                                                                                       DINOP VKBL INDEX
BERRUR CODE FROM MDSTI
DINUM OF CASES
NUM OF FARAMS
                                                                                                                                                                                                                                                                                                                                                                                                   SORI(TWCPI) INVERTED
                                                                                                                                                                                                                          ADD TERM, MATRIX MULT
                                                                                                                                                                                                                                                                                                                                                                                                                                     MATRIX GULT RESULT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         SET NUM OF SOURCES
DEG OF I REEDOM
GET CRII TEE VAL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     LOUP THEU ALL SRCS
CLEAR DERIV VECTOR
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ● LOOP ON INDP VRBL
● FORM STAT
                                                                                                                                                                                                                                                                                                                                                                               REUR EON PARAMS
                                                                                                                                                                                                                                                                                                                                                                   NUM OF ! DURCES
                                                                                                                                                                                                                                                                                                                                                                                         RESTO MEAN SQ
                                                                                                                                                                                                                                                                                                              SOURCE INDEX
                                                                                                                                                                    RECORD OF MODIFICATIONS: ORIGINAL PROGRAM 10-5-82
                                                                                                                                   KEYWORDS: CONFIDENCE INTERVAL, COVARIANCE MAIRIX
RESIDUAL MEAN SQUARE, CRITICAL I VALUE.
                                                                                                                                                                                                                                                                             UTIL INDEX
UTIL INGEX
UTIL INGEX
                                                                                        INTERVALS ON THE PREDICTED VALUES.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             + P ( 2 )*XP ( M )
                                                                                                             APPLICABILITY: ASCII FORTRAN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          NSRC = NPAR - 1
DEGF = FLOAT ( NCAS - NPAF
CALL MDSTI ( ALPHA, DEGF,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                YP ( 61, 10 )
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       DO 50 L = 1, NSRC
                                                                                                                                                                                                                                   REAL ALPHA / .05
REAL COVR ( 50 )
                                                                                                                                                                                                                                                                                                                                                                                                    REAL STPINV
+ / 0.398942280
                                                                                                                                                                                          WAIVERS: NONE
START EDIT PAGE
                                                                                                                                                                                                                                                                                                              INTEGER L
INTEGER M
INTEGER 1ER
INTEGER NOAS
INTEGER NOAS
INTEGER NOAS
INTEGER NOAR
REAL P ( 10 )
                                                                                                                                                                                                                                                                                                                                                                                                                                                 XP ( 61
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 DO 40 M = 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 * 1 01 0d
                                                                                                                                                                                                                                                                                                                                                                                           REAL RMSQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             OF . .
                                                                                                                                                                                                                                                         REAL DEGF
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        CONTINUE
                                                                                                                                                                                                                                                                                          INTEGER J
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000113	600	1F (L .GT. 1)	ADD EXTRA VRBLS EFFECT
000114	600	+ Z = Z + P (L + 1)	
000115	600	Of (1) = -STPINV *	@ DERIVATIVE M/R P(1)
000116	010	* EXP (-0.50*Z*Z)	
000117	600	DF (2) = XP (M)+OF (1)	& DERIVATIVE W/R P (2)
000118	600	1F (L .GT. 1)	@ EXTRA VIBLS EFFECT
911000	600	+ Of (L+1) = Of (1)	
000120	600	VSUM = 0.0	
000121	600	0 " *	@ PRESET COVAR MATRIX INDEX
000122	600	DO 30 1 a 1, NPAR	PRE MULT LOOP (V' X C)
000123	600	00 20 J = 1, 1	● POST MULT LOOP (V)
000124	600	- + × - ×	O INCR COVR INDEX
000125	600	ADD = DF (I) +	MULT
000126	600	. COVR (K) . DF (J)	
000127	600	IF (1 .NE. J)	@ DOUBL OFF DIAG TERMS
000128	600	ADD = ADD + ADD	
000129	600	VSUM = VSUM + ADD	P ACCUMULATE RESULT
000130		CONTINUE	
000131	00 30	CONTINUE	
000132	600	YDEL = TEEC + SQRT (VSUM+RMSQ	VSUM+RMSQ) CHG FOR CONF INT
000133	012	YC (M, 1, L) =	@ UPPER CLINF BOUND
060134	012	• YP (M, L) + YDEL	
000135	012	YC (M, 2, L) =	D LOWER CONF BOUND
000136	012	+ YP (M, L) - YDEL	
000137	009 40	CONTINUE	
000138		CONTINUE	
000139	600	RETURN	
000140	600	END	

T. S.

F-27

		***************************************				IOGZI &	TUPUT	■ INPUT	■ INPUT				XP, YP, NP,	YA, NA, NPLT)	BOYES FOR ALL SOURCES OF	IG THE NONLINEAR	FRON	DP PJR PROGRAM. ALSU PLOT	TS WITH VARIA			ABSCISSA VALUES ARE LIMITED TO THE	90 AKE ORDI	E KANGE O TO 1.			NEWPEN. BGNPL. PAGE, NOCHEK.	PHYSOR, TITLE, HEADIN. YTICKS,	XTICKS, YAXANG, INTAXS, HEIGHT,	ŭ.	, CURVE, RESET, ENDPL	L FROM N+ADISSPLA LIB)			● 7171E OF PLOT	FOR PRED CURVE	@ Y CORRDS FOR PRED CURVES		FOR OUS DATA	X S MARKING	A MINE OF COR DATA DIS	TIG UTIN DE TRICE DE									MUT MUCKE L-UL/Lat
	RLIB70 10/09-10:45:55-(17.)	SUBROUTINE PLTALL (, HOM			×	. **	*	+ NPLT	•	NAME: PASS*NLRPLT.PLTALL		USAGE: CALL PLIALL (HOR,	X Y Y	Plippore: Plot bRenicien Claves	SOUND	REGRESSION EQUATI	WITH THE UCLA BMDP	THE OBSERVED DATA	SIZE X'S .		LIMITATIONS: ABSCISSA VALU	RANGE 130 TO	VALUES 10 THE	anon . 32m most		SUBPROGRAMS REGUIRED: NEWF		XIIC	GRAF	. 100	(ALL			HOM	dx	٧p	ď	Y X	;	4	F 02			INPUT/OUTPUT: NONE		OUTPUT FILE: PLOTS	1	NOTES: NONE		PROGRAMMEN/ORGANIZALION: MOTMOCKEL-OL/COC
PLTALL	10/09-	e (.	. 4		. 6		4	4	4 C.+	4 C++		• • •	2 0		4	4 C	4 C••	4 C••	4 C••		* · ·		•	4	4 C	4 C •	4 C++	•		• • •		7	4		4 C.	4 C••			• • •	7 <	. 4			4 C.*	* C * *	4	4,	• • •	٠ د د
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CALL NOCHEK
CALL PHYSOR ( 0.9, 1.2 )
CALL TITLE ( 1H , 1,
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P USE INT NUMS TO LBL X	O DE SET METCHT OF CHARS		190.0. @ LBL UPPER ABSCISSA		6.0, . LBL RIGHT SIDE ORD	-	& DRAW A FRAME ARCUND PLOT	P DRAW CTR LINE	ORAW X AXIS LINE	● DOT THE PRED CURVES	● LOOP THRU NUM CURVES	● DRAW A PRED CURVE		END OF PRED LOOP	◆ GO BACK TO SOLID LINES	◆ LOOP THRU OBS DATA PTS	.1). • LOW LEFT TO UP RT	•	1.1), . LOW RT 10 UP LEFT		● END LOOP OBS DATA PTS	● FINISH FLOT	ONLY PROG EXIT				
INTAXS	CALL HEIGHT (0.1)	-0.1.0.1.1	CALL XGRAXS (130.0, 5.0, 190	1, -100, 0.0, 6	CALL YGRAXS (-0.1, 0.1, 1.0,	. '\$ ', -100, 9.5, 0.0)	ш	CURVE (X1,	CALL CURVE (X1, Y0, 2, 0)	CALL DOT	DO 30 I = 1, NP	CALL CURVE (XP, YP(1,1),	·	CONTINUE	CALL RESET ('DOT')	DO 40 1 * 1, NA	CALL CURVE (XA(1,1), YA(1,1),	2, 0)	CALL CURVE (XA(3,1), YA(3,1),	2, 0)	CONTINUE	CALL ENDPL(-K)	RETURN	END			
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                      PROGRAMMER/ORGANIZATION: MOFMOCKEL-JL/CSC
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+/'PREDICTION FOR PLATFORM NO.
REAL X1 ( 2 ) / 130.0, 190.0 /
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CONTINUE ENCODE (25, PLAT) NPAT FORMAT (13)	(29:32) HEADIN (CALL HEADIN (MDR. I, 2, 2) CALL YIICKS (5)			HEIGHT (0.1)	CALL GRAF (130., 5., 190.,	CALL XGRAXS (130.0, 5.0, 190.0,	5, '\$ ', -100, 0.0, 6.0	CALL YGRAXS (-0.1, 0.1, 1.0, 6.0,) - (1)		CALL CURVE (X1, Y1, 2, 0)	_		D01	CURVE (LL RES	~ ·	CALL CURVE (XP, YC (1, I, 1)	CONTINUE	CALL GRACE (0.5)	LL RESET (4Z -	CALL CURVE (XA(1,1), YA(1,1),	2, 0	¥	2, 0)		CALL ENDFL(-K) DETLIDN	CND
004 20 005 20		005 008	200	004	004	000	000	005	000	000	900	004	900	007	004	900	004	004	000	004 30		900	004	004	004	004		004 40	4 6	000
0000113	000116	000118	000120	000122	000123	000124	000126	000127	000128	000130	000131	000132	000133	000134	000135	000136	000137	000138	000139	- 1000 F	3000142	000143	000144	000145	000146	000147	000148	000149	000150	000152

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END ELT.

EL1017 000001 000003 000003 000004	RL1870 10 000 000 003 003	NLRPIT.RUN/NLRPLT RLIB70 10/07-08:00:53-(4,) 000 8XQT PASS*NLRPLT.NLRPLT		
000000000000000000000000000000000000000	003	AXO! PASSINIAPLE.NIAPLE		
0000	003	SINPUTS		
0000		FILNAM='PASS*NLRDAT',		
	>>>	VERS='S',		
900000	000	COVAR=T,	-	
- 200000	004	LEVELS=T.		-
80000	500	7100 SE .		
010000	000	SEND.		
000011	005	SINPUTS		
000012	003	ELEMª PRT2'.		
000013	002			
000014	005	\$ INPUTS		
000015	003	ELEM='PRT3',		
000016	700	- STOPat,		
5	700	SEND.		
END ELT				
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PROBLEM FITTE IS: REGRESSION ON REAL DATA

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REGRESSION TITLE IS: PARAMETERS FROM DATA SET # 1 (6 PLATFORMS)

ESTIMATED LEVELS DATA:

S. D. OF S. E. = 4.36 DB

SOURCE # SL ~ RD # DF CASES
1 162.60 11
2 162.10 12
3 161.59 13
4 167.71 14
5 161.46 17
6 171.31 4

The same was the

REGRESSION ON REGRESSION TI PARAMETERS FR	SION	REGRESSION ON REAL DATA REGRESSION TITLE IS: PARAMETERS FROM DATA SET #	1 1 1 6	PLATFORMS)					
PARAME	TER (PARAMETER COVARIANCE MATRIX:	TRIX:						
		PI	P2	P3	P4	PS	ь6	P7	
ء	-	1 343260.28516		e	₹ .	vs	ø		
P 2 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	; '⊶ ພ ∡ :	-1967.51009 -1770.35278 -6691.50110		1290.93414		,			
.v. &	9	-450. Ti075 -9069. 41174		669.62265 697.31034	666, 49590	1	1125,10039	The state of the s	
P7	7	21662.58887	-128.24621	598.83887		684.64915	122.95341	4049.90549	
F-3									
7									
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PROBLEM TITLE 1S: REGRESSION ON REAL DATA
REGRESSION TITLE 1S: Parameters from data set # 2 (5 platforms)
5. E. = 14.90 C
151.82
3 132.42 11 4 169.47 20 5 139.02 15
-38

PROBLEM 111E 15: REGRESSION ON REAL DATA REGRESSION ON REAL DATA REGRESSION TITLE 15: PARAMETER FROM DATA SET # 2 PARAMETER COVARIANCE MATRIX: P1

117 E 15: 177 E E S = 157.7 148.7 157.9 150.8		IT # 3 (5 PLATFORMS)			# OF CASES 13 13	16						
1171E 1S: NO REAL DATA NO TITLE 1S: SE FROM DATA SET # 157.79 148.78 156.82 150.82 150.82		7 3 (5			<u> </u>	16					A COMPANY OF THE PROPERTY OF T	
CGRESSIO CGRESSIO CRESSIO STIMATED 1 5. D. OF 5. D. OF 5. D. OF	PROBLEM TITLE 1S: REGRESSION ON REAL DATA	REGRESSION TITLE IS: PARAMETERS FROM DATA SE	ESTIMATED LEVELS DATA:	. S. E. =	# SL -	157.91						

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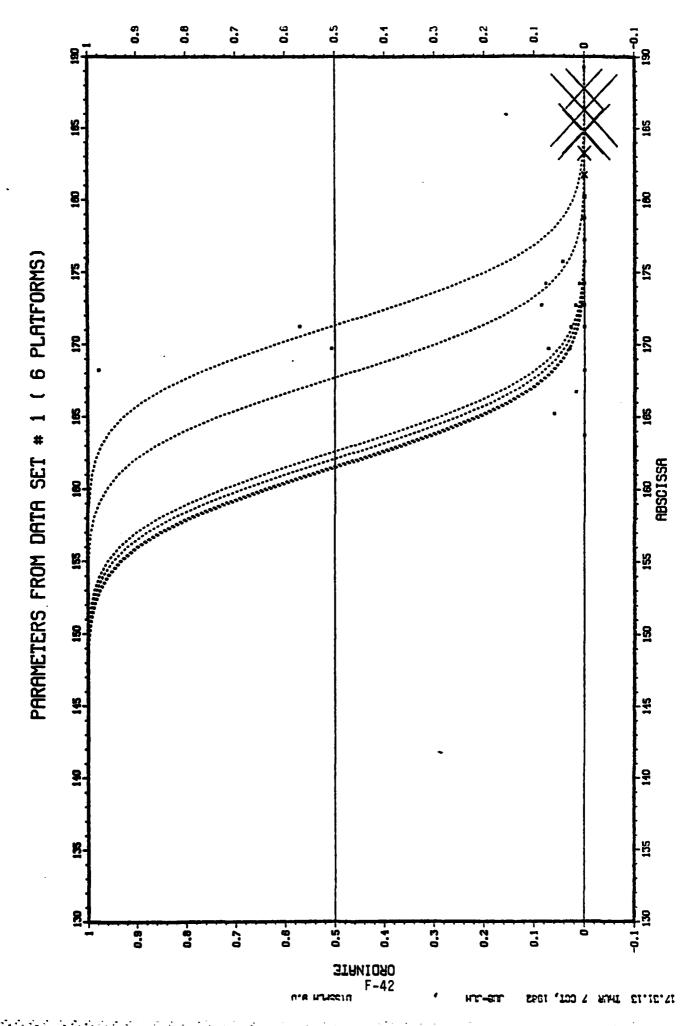
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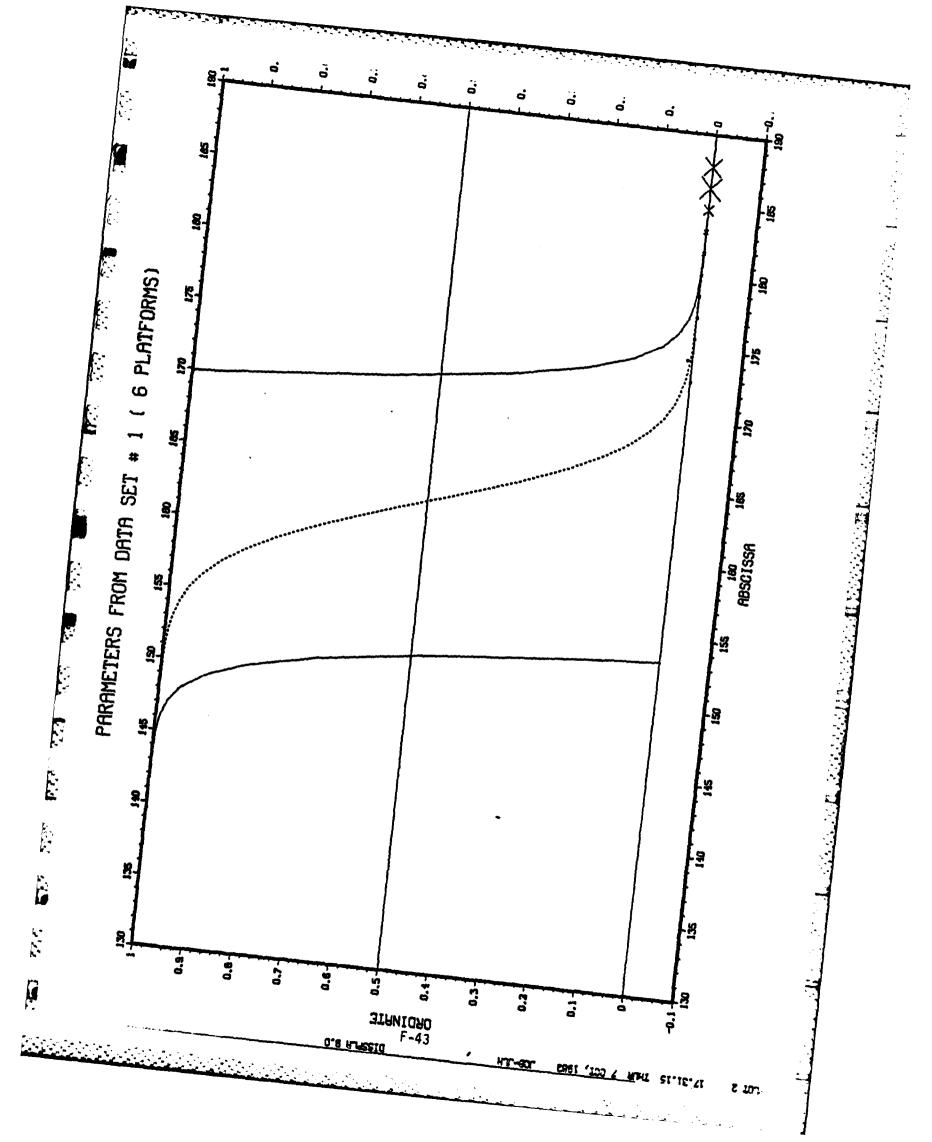
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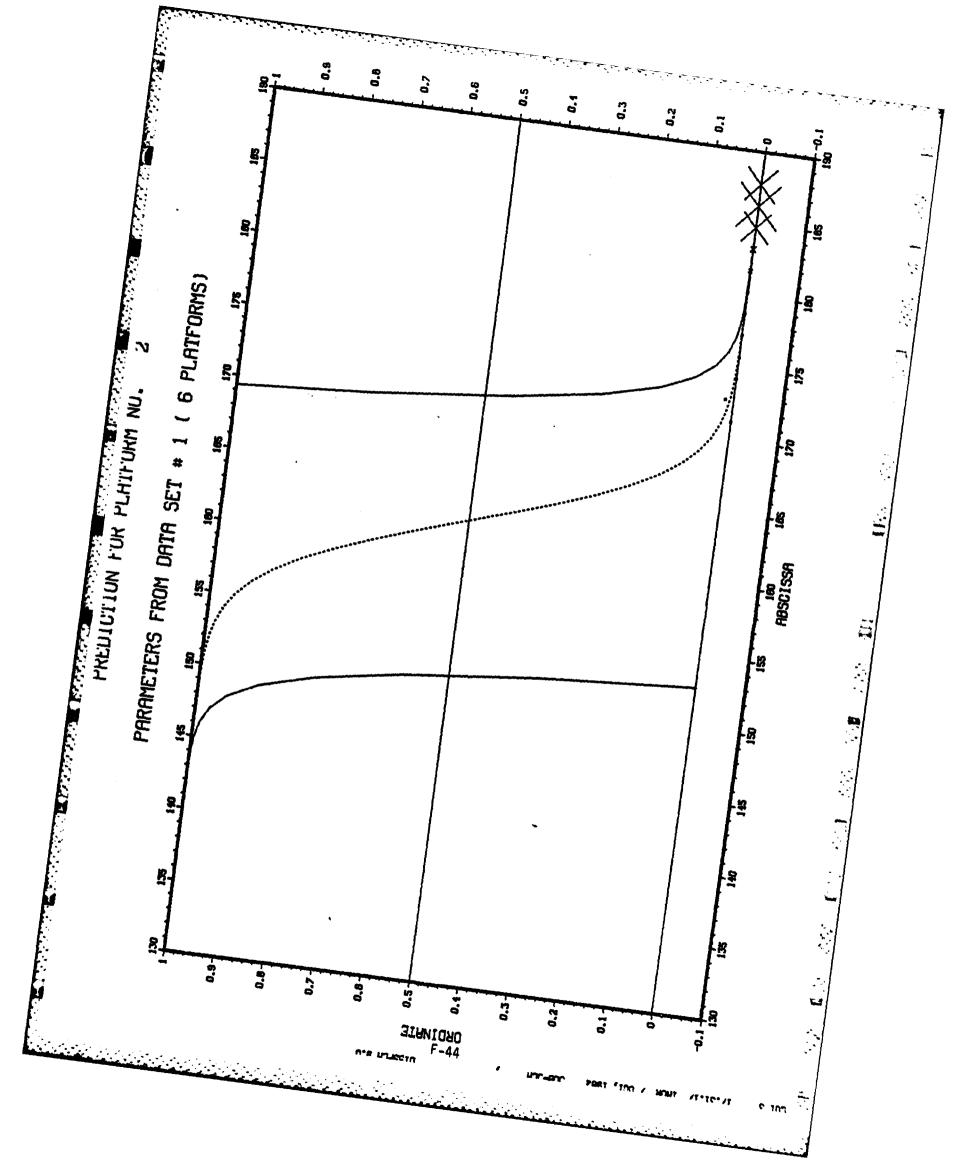
ROBLEN TI EGRESSION	TLE IS:								
EGRESSION ARAMETERS	REGRESSION TITLE IS: PARAMETERS FROM DATA SET	# 3 (5 PLAT	PLATFORMS)						
ARAMETER	PARAMETER COVARIANCE MATRIX:	IX:					-		
	16	P2	83	P4	P5	P6			
	1 17227. R2164	8	ო	4	un	9			
P2 P3 P3 P4	-99, 36263 -268, 70656 373, 88765	. 57665	415.77539	246.31940	,				
	-297.13247	1.11404	106.95747	99.76179	134.49627 106.30200	318,38564			
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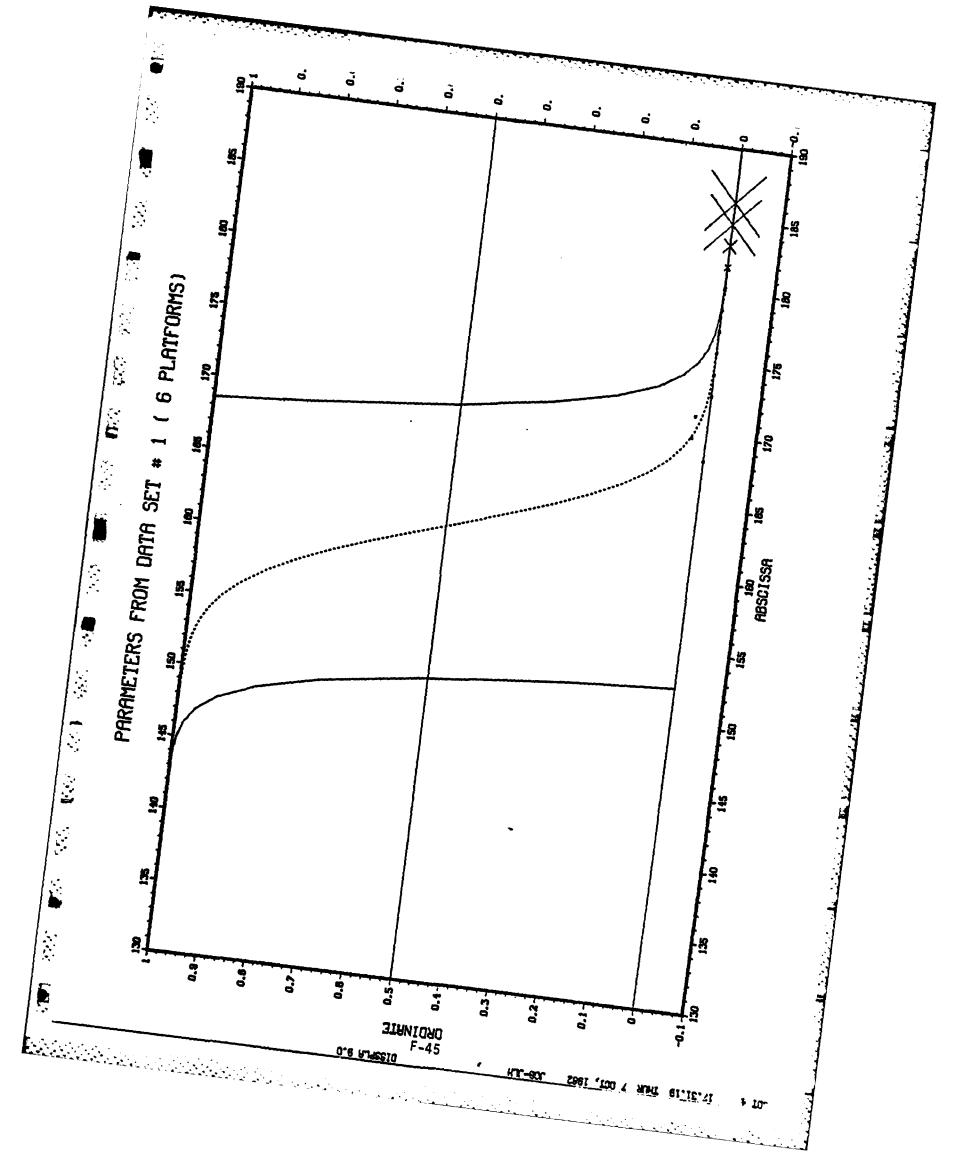
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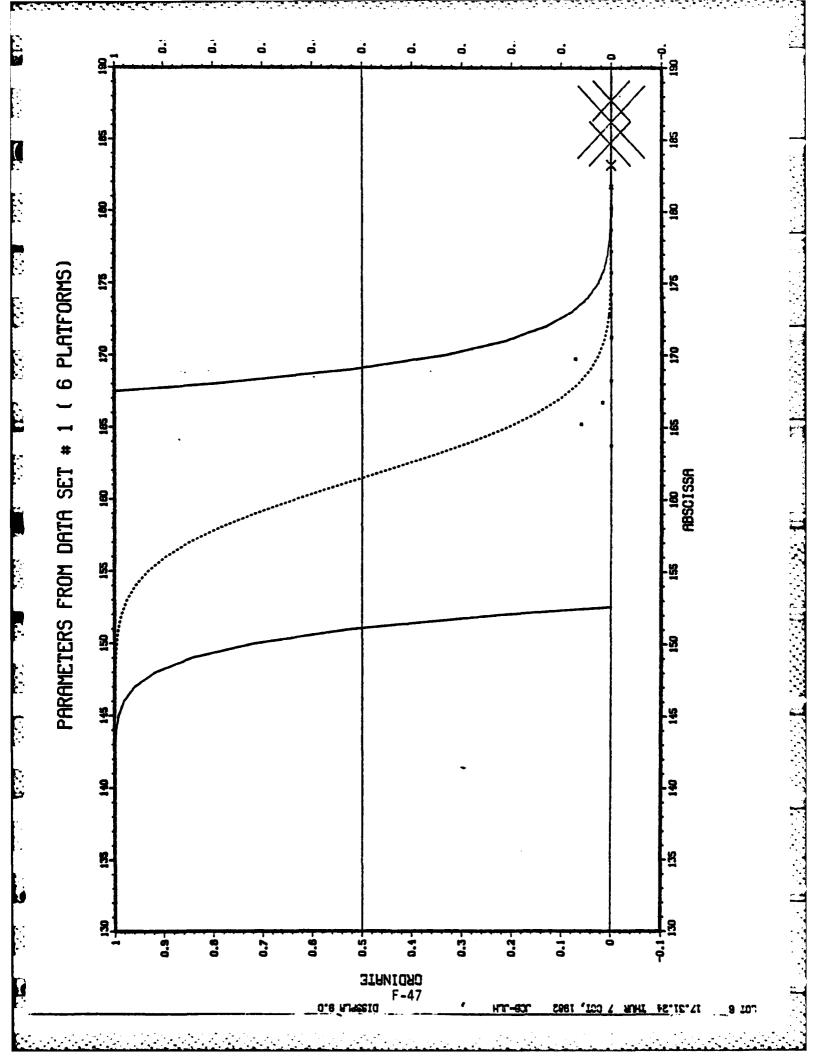
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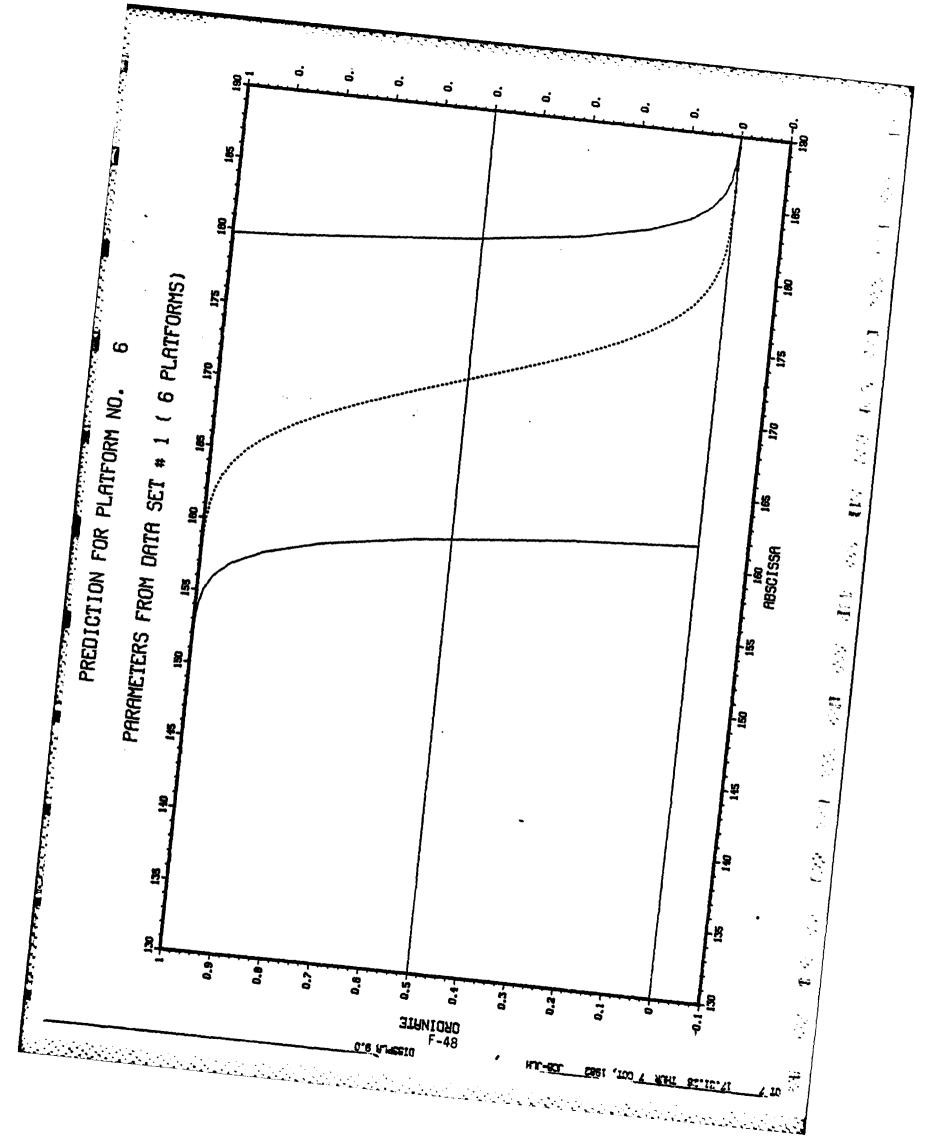


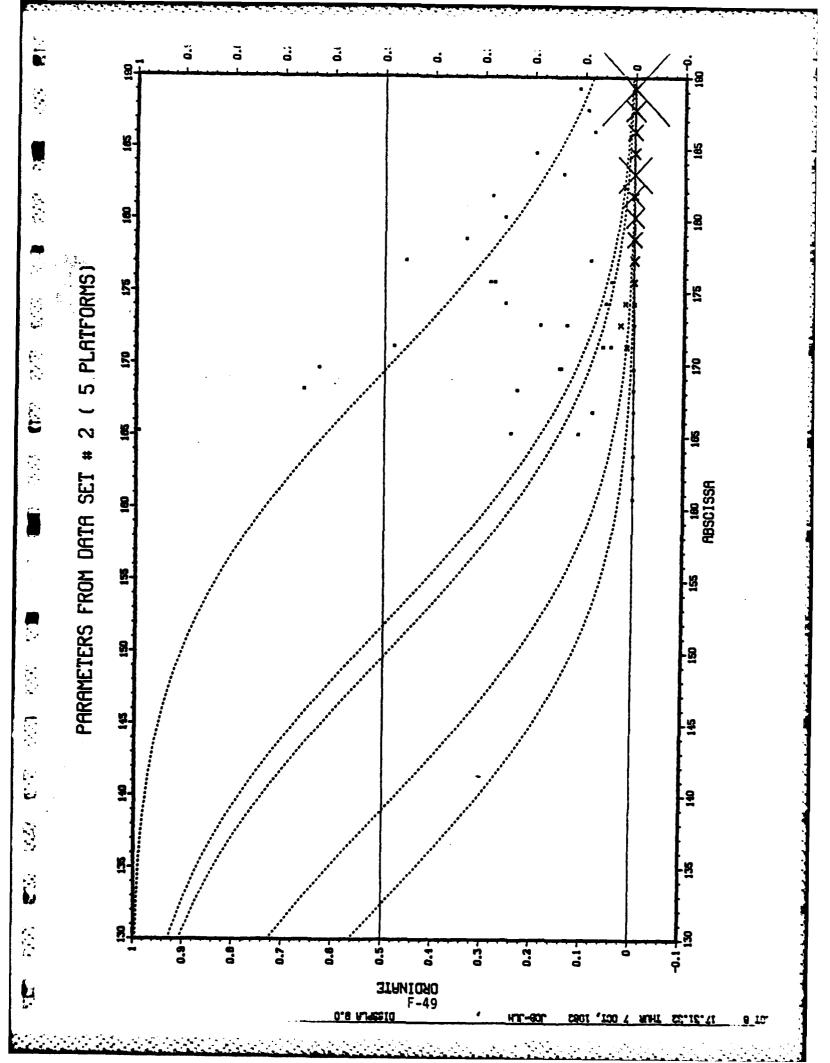


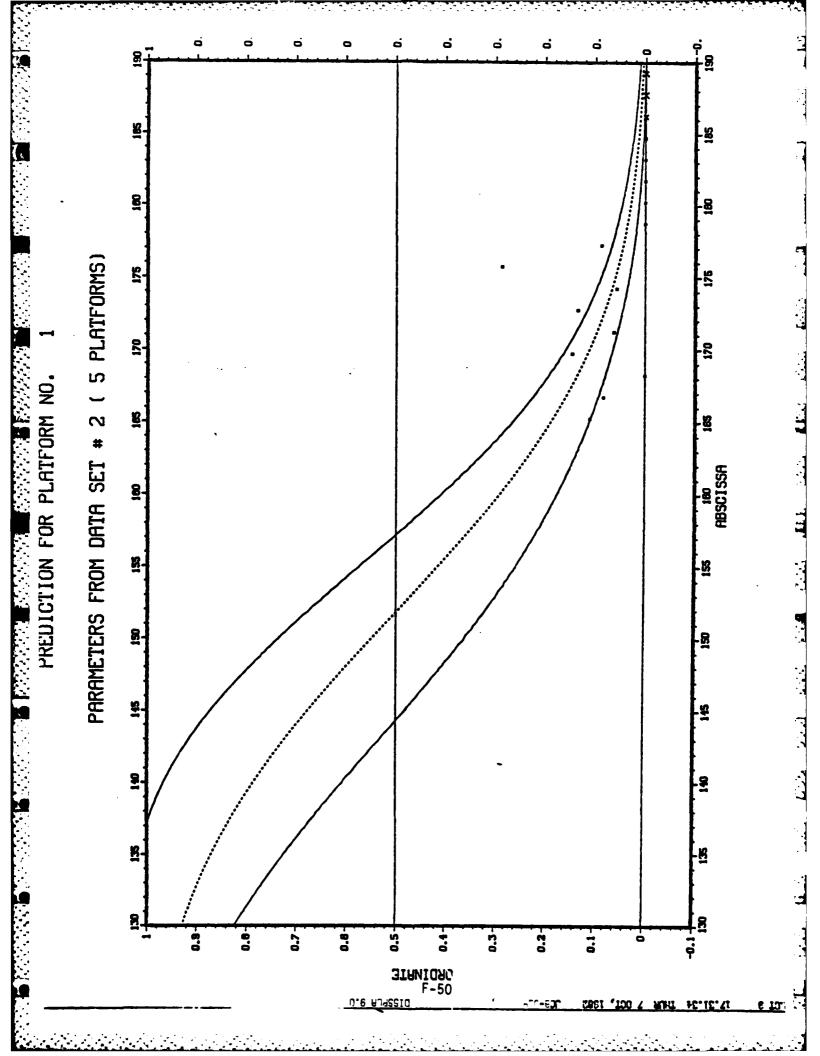


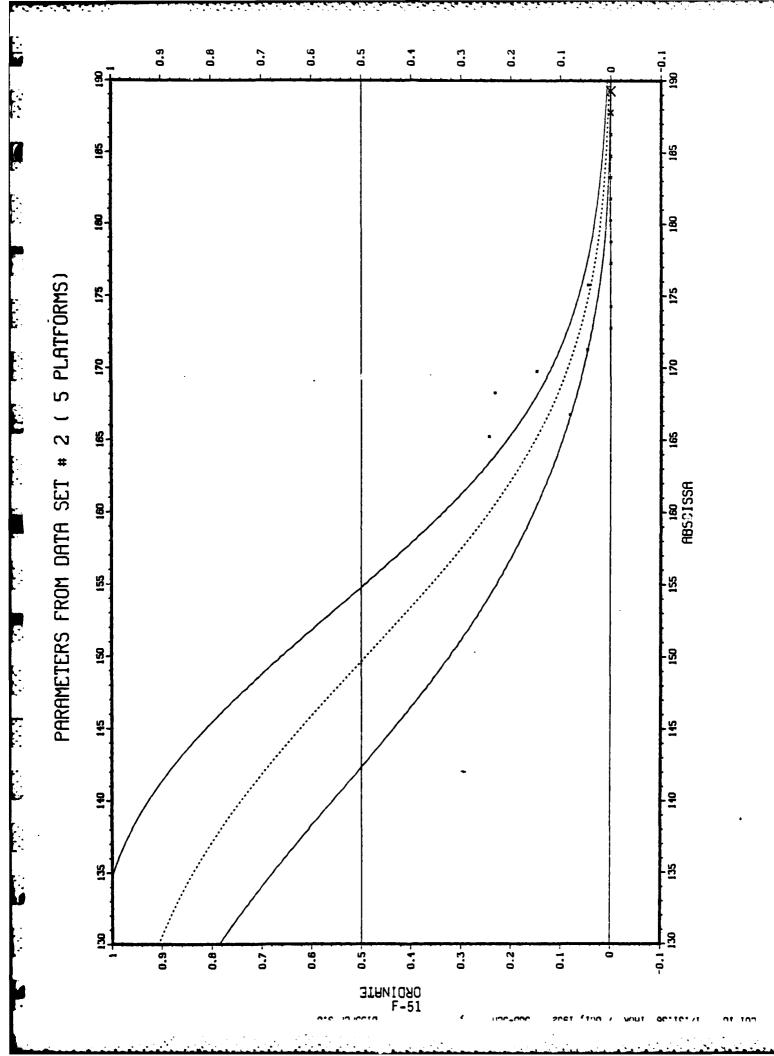




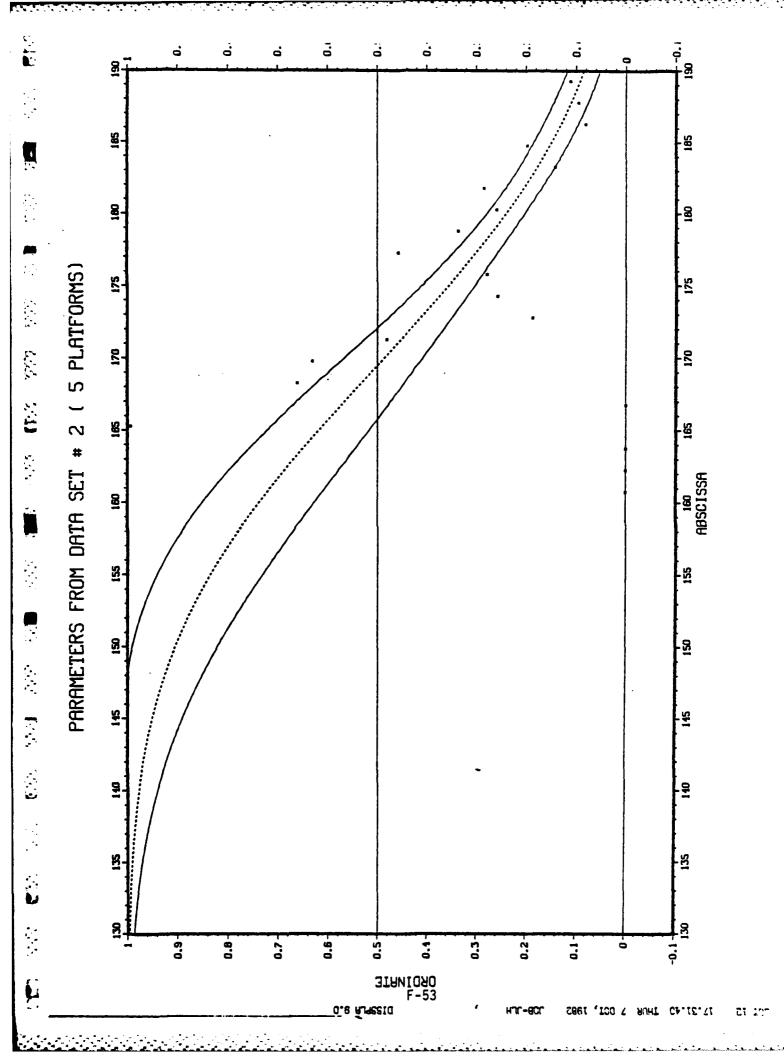


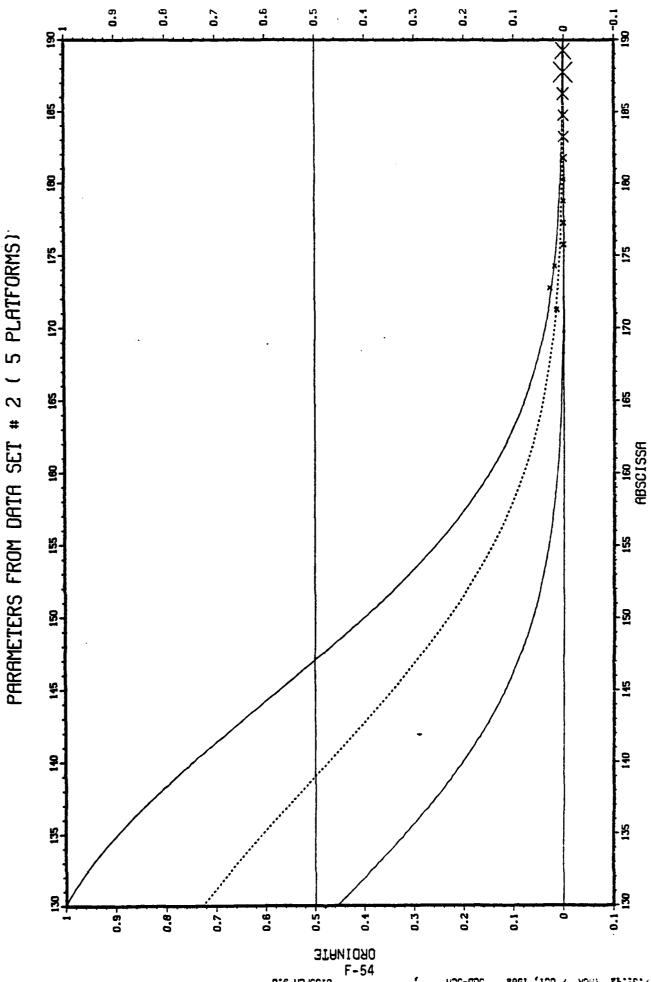






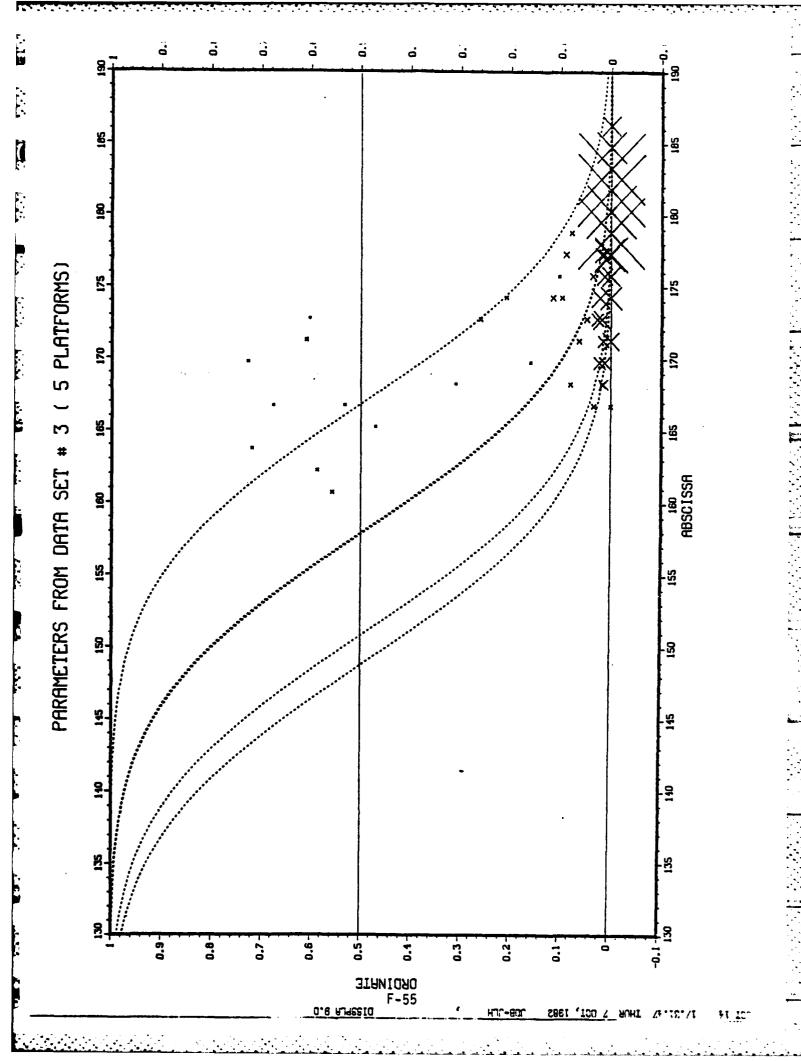
PREDICTION FOR PLATFORM NO.

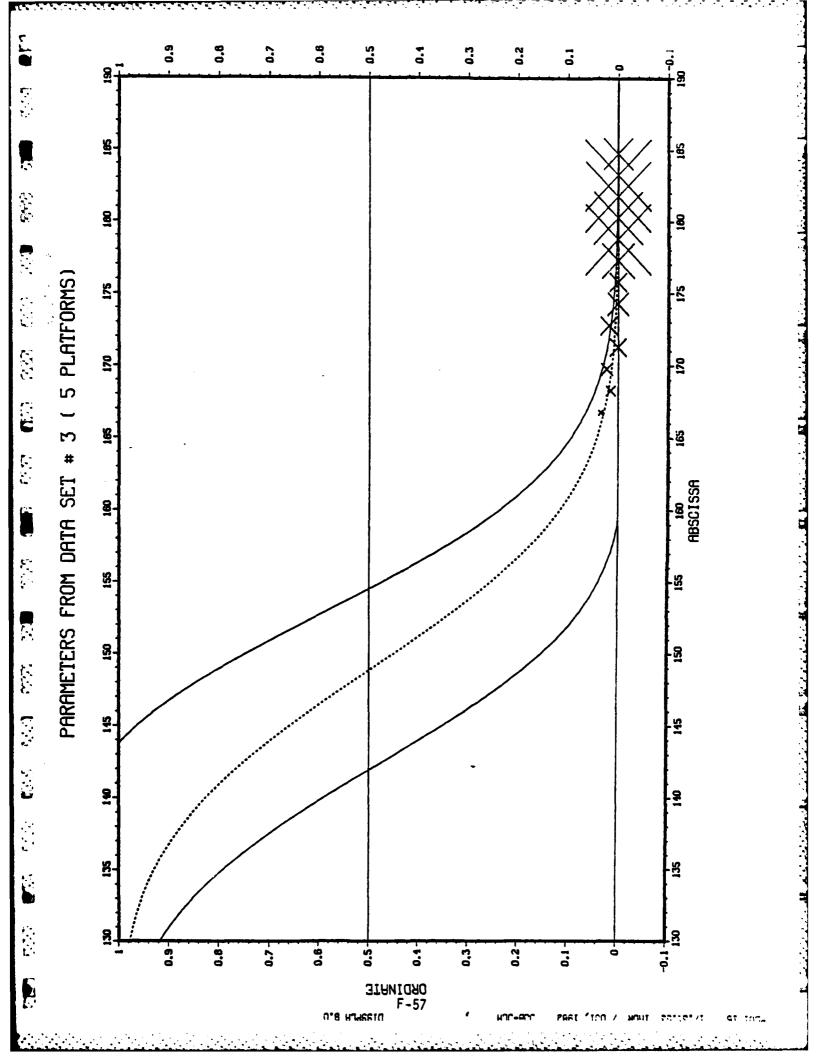




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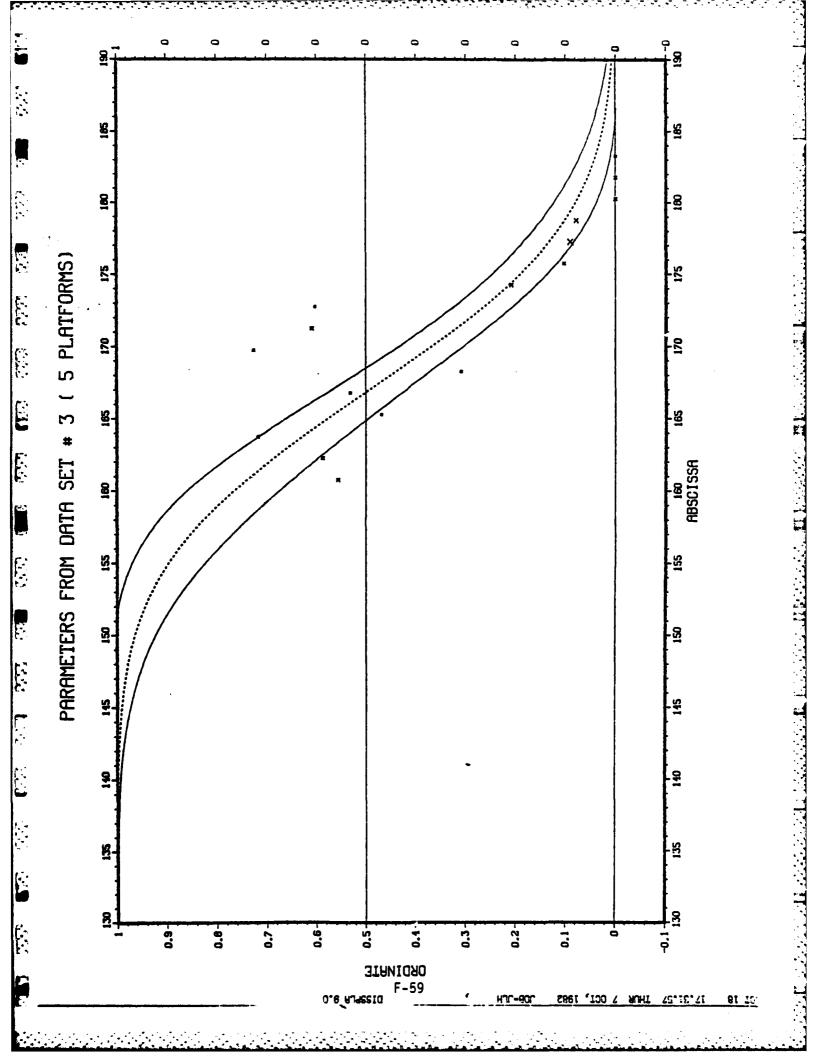
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